Appendix I

Scanning Electron Microscopy Images

(Kirtland AFB, NM)

Distribution Statement A. Approved for Public Release.

FIGURES

Page

Figure I-1.SEM images of pure silver sample retrieved on 21 months exposure from Kirtland AFB site. (a) 100X magnification (b) 250X magnification, (c) 500X magnification, and (d) 2000X magnification.....6

Figure I-2.SEM images of pure silver sample retrieved on 18 months exposure from Kirtland AFB site. (a) 100X magnification (b) 250X magnification, (c) 500X magnification, and (d) 2000X magnification.....7

Figure I-3.SEM images of pure silver sample retrieved on 15 months exposure from Kirtland AFB site. (a) 100X magnification (b) 250X magnification, (c) 500X magnification, and (d) 2000X magnification.....8

Figure I-4. SEM images of pure silver sample retrieved on 12 months exposure from Kirtland AFB site. (a) 100X magnification (b) 250X magnification, (c) 500X magnification, and (d) 2000X magnification. 9

Figure I-5. SEM images of pure silver sample retrieved on 9 months exposure from Kirtland AFB site. (a) 100X magnification (b) 250X magnification, (c) 500X magnification, and (d) 2000X magnification..... 10

Figure I-6. SEM images of pure silver sample retrieved on 6 months exposure from Kirtland AFB site. (a) 100X magnification (b) 250X magnification, (c) 500X magnification, and (d) 1000X magnification..... 11

Figure I-7. SEM images of pure silver sample retrieved on 3 months exposure from Kirtland AFB site. (a) 100X magnification (b) 250X magnification, (c) 500X magnification and (d) 1000X magnification..... 12

Figure I-8. SEM images of aluminum alloy 7075 sample retrieved on 24 months exposure from Kirtland AFB site. (a) 100X magnification (b) 250X magnification, (c) 500X magnification, and (d) 2000X magnification.. 13

Figure I-9. SEM images of aluminum alloy 7075 sample retrieved on 21 months exposure from Kirtland AFB site. (a) 100X magnification (b) 250X magnification, (c) 500X magnification, and (d) 2000X magnification.. 14

Figure I-10. SEM images of aluminum alloy 7075 sample retrieved on 18 months exposure from Kirtland AFB site. (a) 100X magnification (b) 250X magnification, (c) 500X magnification, and (d) 2000X magnification.. 15

Figure I-11. SEM images of aluminum alloy 7075 sample retrieved on 15 months exposure from Kirtland AFB site. (a) 100X magnification (b) 250X magnification, (c) 500X magnification, and (d) 2000X magnification.. 16

Figure I-12. SEM images of aluminum alloy 7075 sample retrieved on 12 months exposure from Kirtland AFB site. (a) 100X magnification (b) 250X magnification, (c) 500X magnification, and (d) 2000X magnification.. 17

Figure I-13. SEM images of aluminum alloy 7075 sample retrieved on 9 months exposure from Kirtland AFB site. (a) 100X magnification (b) 250X magnification, (c) 500X magnification, and (d) 2000X magnification.. 18

Figure I-14. SEM images of aluminum alloy 7075 sample retrieved on 6 months exposure from Kirtland AFB site. (a) 100X magnification (b) 250X magnification, (c) 500X magnification,. and (d) 100X magnification 19

Distribution Statement A. Approved for Public Release.

Figure I-15. SEM images of aluminum alloy 7075 sample retrieved on 3 months exposure from Kirtland AFB site. (a) 100X magnification (b) 250X magnification, (c) 500X magnification, and (d) 1000X magnification... 20

Figure I-16. SEM images of aluminum alloy 6061 sample retrieved on 24 months exposure from Kirtland AFB site. (a) 100X magnification (b) 250X magnification, (c) 500X magnification, and (d) 2000X magnification... 21

Figure I-17. SEM images of aluminum alloy 6061 sample retrieved on 21 months exposure from Kirtland AFB site. (a) 100X magnification (b) 250X magnification, (c) 500X magnification, and (d) 2000X magnification... 22

Figure I-18. SEM images of aluminum alloy 6061 sample retrieved on 18 months exposure from Kirtland AFB site. (a) 100X magnification (b) 250X magnification, (c) 500X magnification, and (d) 2000X magnification... 23

Figure I-19. SEM images of aluminum alloy 6061 sample retrieved on 15 months exposure from Kirtland AFB site. (a) 100X magnification (b) 250X magnification, (c) 500X magnification, and (d) 2000X magnification... 24

Figure I-20. SEM images of aluminum alloy 6061 sample retrieved on 12 months exposure from Kirtland AFB site. (a) 100X magnification (b) 250X magnification, (c) 500X magnification, and (d) 2000X magnification... 25

Figure I-21. SEM images of aluminum alloy 6061 sample retrieved on 9 months exposure from Kirtland AFB site. (a) 100X magnification (b) 250X magnification, (c) 500X magnification, and (d) 2000X magnification... 26

Figure I-22. SEM images of aluminum alloy 6061 sample retrieved on 6 months exposure from Kirtland AFB site. (a) 100X magnification (b) 250X magnification, (c) 500X magnification. , and (d) 1000X magnification. 27

Figure I-23. SEM images of aluminum alloy 6061 sample retrieved on 3 months exposure from Kirtland AFB site. (a) 100X magnification (b) 250X magnification, (c) 500X magnification, and (d) 1000X magnification... 28

Figure I-24. SEM images of aluminum alloy 2024 sample retrieved on 24 months exposure from Kirtland AFB site. (a) 100X magnification (b) 250X magnification, (c) 500X magnification, and (d) 2000X magnification... 29

Figure I-25. SEM images of aluminum alloy 2024 sample retrieved on 21 months exposure from Kirtland AFB site. (a) 100X magnification (b) 250X magnification, (c) 500X magnification, and (d) 2000X magnification... 30

Figure I-26. SEM images of aluminum alloy 2024 sample retrieved on 18 months exposure from Kirtland AFB site. (a) 100X magnification (b) 250X magnification, (c) 500X magnification, and (d) 2000X magnification... 31

Figure I-27. SEM images of aluminum alloy 2024 sample retrieved on 15 months exposure from Kirtland AFB site. (a) 100X magnification (b) 250X magnification, (c) 500X magnification, and (d) 2000X magnification... 32

Figure I-28. SEM images of aluminum alloy 2024 sample retrieved on 12 months exposure from Kirtland AFB site. (a) 100X magnification (b) 250X magnification, (c) 500X magnification, and (d) 2000X magnification... 33

Figure I-29. SEM images of aluminum alloy 2024 sample retrieved on 9 months exposure from Kirtland AFB site. (a) 100X magnification (b) 250X magnification, (c) 500X magnification, and (d) 2000X magnification... 34

Distribution Statement A. Approved for Public Release.

Figure I-30. SEM images of aluminum alloy 2024 sample retrieved on 6 months exposure from Kirtland AFB site. (a) 100X magnification (b) 250X magnification, (c) 500X magnification , and (d) 1000X magnification.. 35

Figure I-31. SEM images of aluminum alloy 2024 sample retrieved on 3 months exposure from Kirtland AFB site. (a) 100X magnification, (b) 250X magnification, (c) 500X magnification, and (d) 1000X magnification.. 36

Figure I-32. SEM images of pure copper sample retrieved on 24 months exposure from Kirtland AFB site. (a) 100X magnification (b) 250X magnification, (c) 500X magnification, and (d) 2000X magnification. 37

Figure I-33. SEM images of pure copper sample retrieved on 21 months exposure from Kirtland AFB site. (a) 100X magnification (b) 250X magnification, (c) 500X magnification, and (d) 2000X magnification. 38

Figure I-34. SEM images of pure copper sample retrieved on 18 months exposure from Kirtland AFB site. (a) 100X magnification (b) 250X magnification, (c) 500X magnification, and (d) 2000X magnification. 39

Figure I-35. SEM images of pure copper sample retrieved on 15 months exposure from Kirtland AFB site. (a) 100X magnification (b) 250X magnification, (c) 500X magnification, and (d) 2000X magnification. 40

Figure I-36. SEM images of pure copper sample retrieved on 12 months exposure from Kirtland AFB site. (a) 100X magnification (b) 250X magnification, (c) 500X magnification, and (d) 2000X magnification. 41

Figure I-37. SEM images of pure copper sample retrieved on 9 months exposure from Kirtland AFB site. (a) 100X magnification (b) 250X magnification, (c) 500X magnification, and (d) 2000X magnification. 42

Figure I-38. SEM images of pure copper sample retrieved on 6 months exposure from Kirtland AFB site. (a) 100X magnification (b) 250X magnification, (c) 500X magnification., and (d) 1000X magnification. 43

Figure I-39. SEM images of pure copper sample retrieved on 3 months exposure from Kirtland AFB site. (a) 100X magnification (b) 250X magnification, (c) 500X magnification, and (d) 1000X magnification. 44

Figure I-40. SEM images of 1010 steel sample retrieved on 24 months exposure from Kirtland AFB site. (a) 100X magnification (b) 250X magnification, (c) 500X magnification, and (d) 2000X magnification. 45

Figure I-41. SEM images of 1010 steel sample retrieved on 21 months exposure from Kirtland AFB site. (a) 100X magnification (b) 250X magnification, (c) 500X magnification, and (d) 2000X magnification. 46

Figure I-42. SEM images of 1010 steel sample retrieved on 18 months exposure from Kirtland AFB site. (a) 100X magnification (b) 250X magnification, (c) 500X magnification, and (d) 2000X magnification. 47

Figure I-43. SEM images of 1010 steel sample retrieved on 15 months exposure from Kirtland AFB site. (a) 100X magnification (b) 250X magnification, (c) 500X magnification, and (d) 2000X magnification. 48

Figure I-44. SEM images of 1010 steel sample retrieved on 12 months exposure from Kirtland AFB site. (a) 100X magnification (b) 250X magnification, (c) 500X magnification, and (d) 2000X magnification. 49

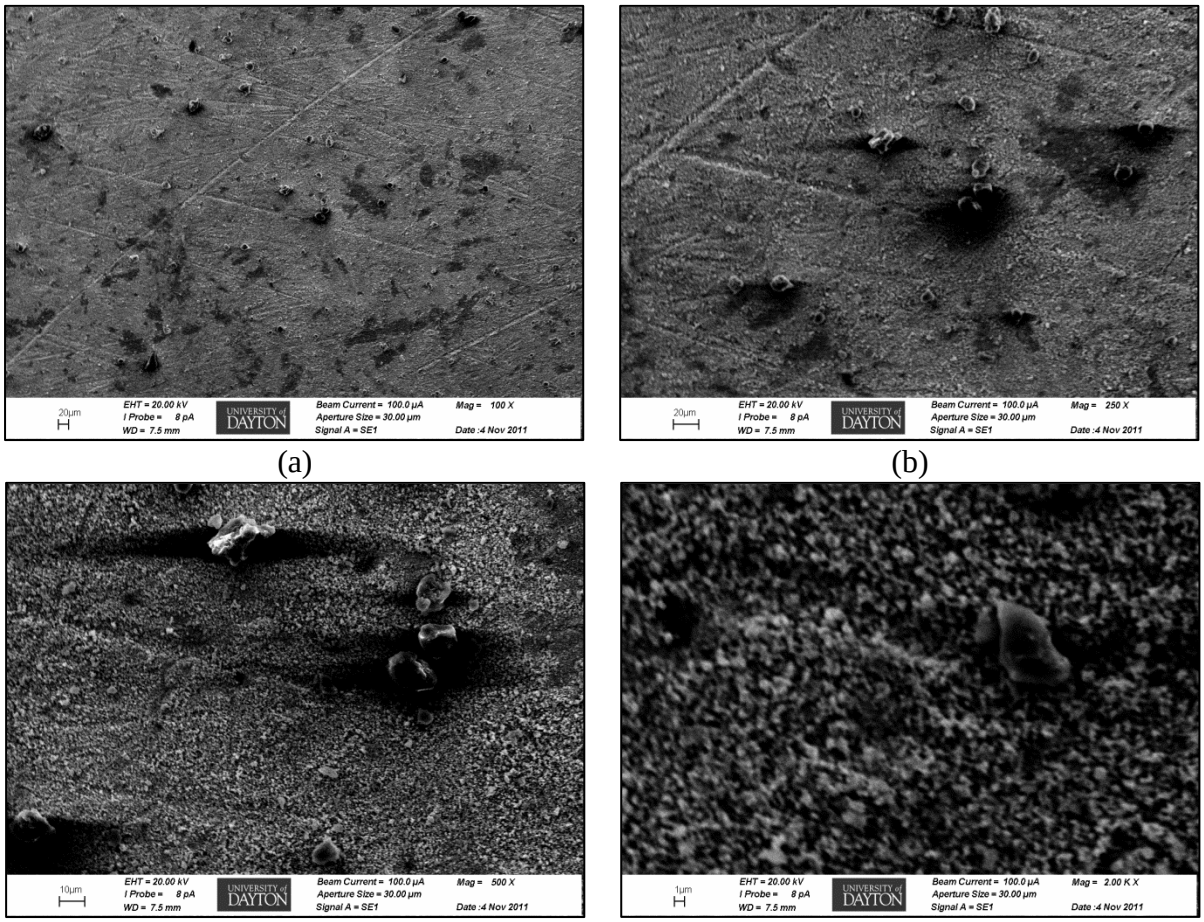
Distribution Statement A. Approved for Public Release.

Figure I-45. SEM images of 1010 steel sample retrieved on 9 months exposure from Kirtland AFB site. (a) 100X magnification (b) 250X magnification, (c) 500X magnification, and (d) 2000X magnification. 50

Figure I-46. SEM images of 1010 steel sample retrieved on 6 months exposure from Kirtland AFB site. (a) 100X magnification (b) 250X magnification, (c) 500X magnification, and (d) 1000X magnification. 51

Figure I-47. SEM images of 1010 steel sample retrieved on 3 months exposure from Kirtland AFB site. (a) 100X magnification, (b) 250X magnification, (c) 500X magnification, and (d) 1000X magnification. 52

Distribution Statement A. Approved for Public Release.

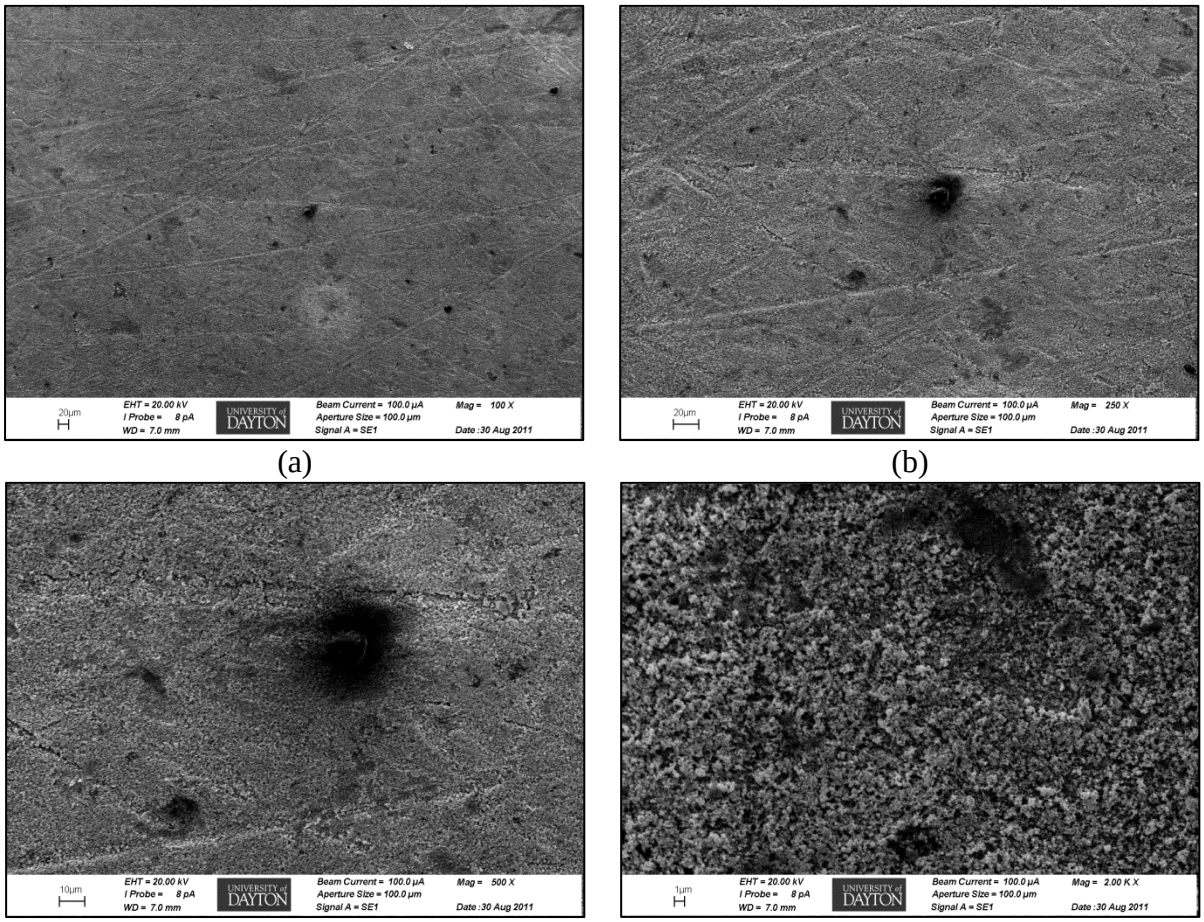


(a) (b)

(c) (d)

Figure I-1.SEM images of pure silver sample retrieved on 21 months exposure from Kirtland AFB site. (a) 100X magnification (b) 250X magnification, (c) 500X magnification, and (d) 2000X magnification.

Distribution Statement A. Approved for Public Release.

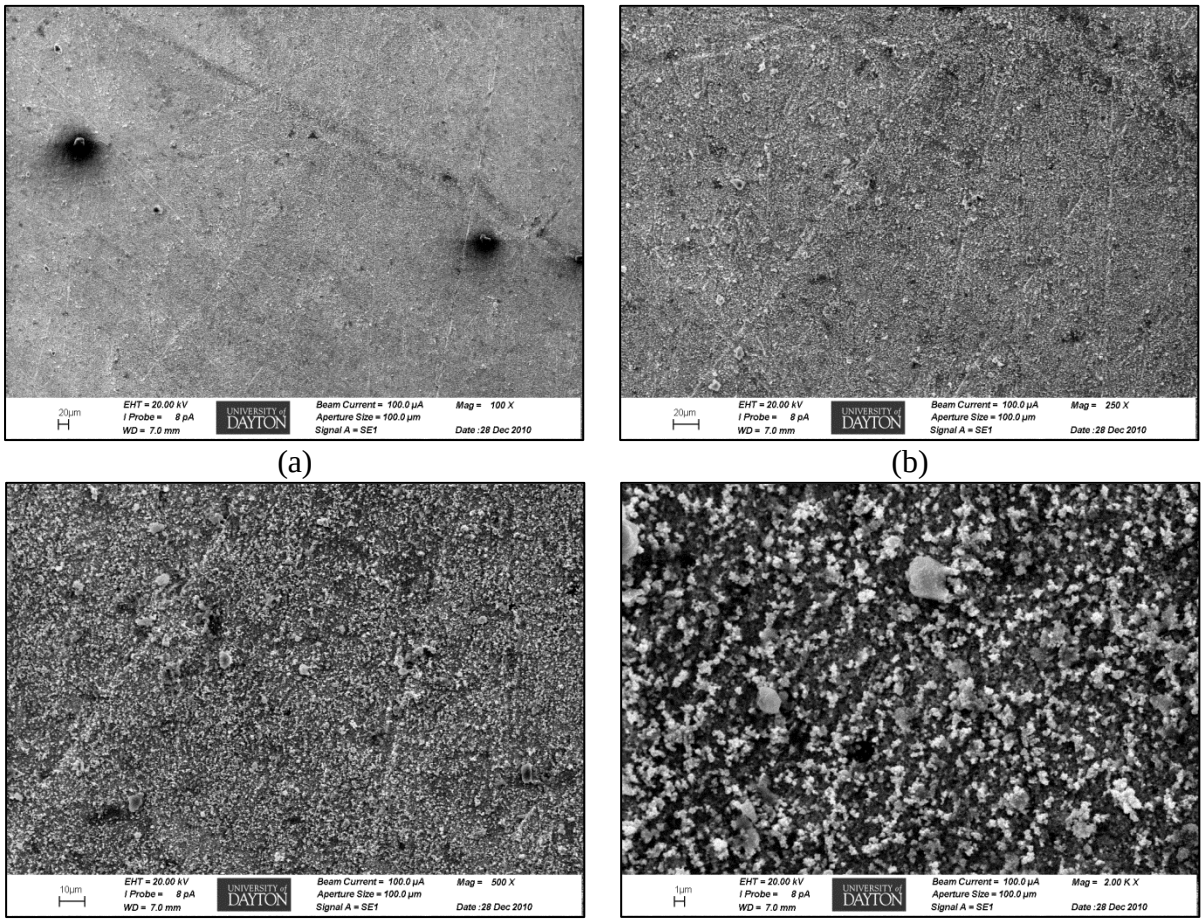


(a) (b)

(c) (d)

Figure I-2.SEM images of pure silver sample retrieved on 18 months exposure from Kirtland AFB site. (a) 100X magnification (b) 250X magnification, (c) 500X magnification, and (d) 2000X magnification.

Distribution Statement A. Approved for Public Release.



(a) (b)

(c) (d)

Figure I-3.SEM images of pure silver sample retrieved on 15 months exposure from Kirtland AFB site. (a) 100X magnification (b) 250X magnification, (c) 500X magnification, and (d) 2000X magnification.

Distribution Statement A. Approved for Public Release.

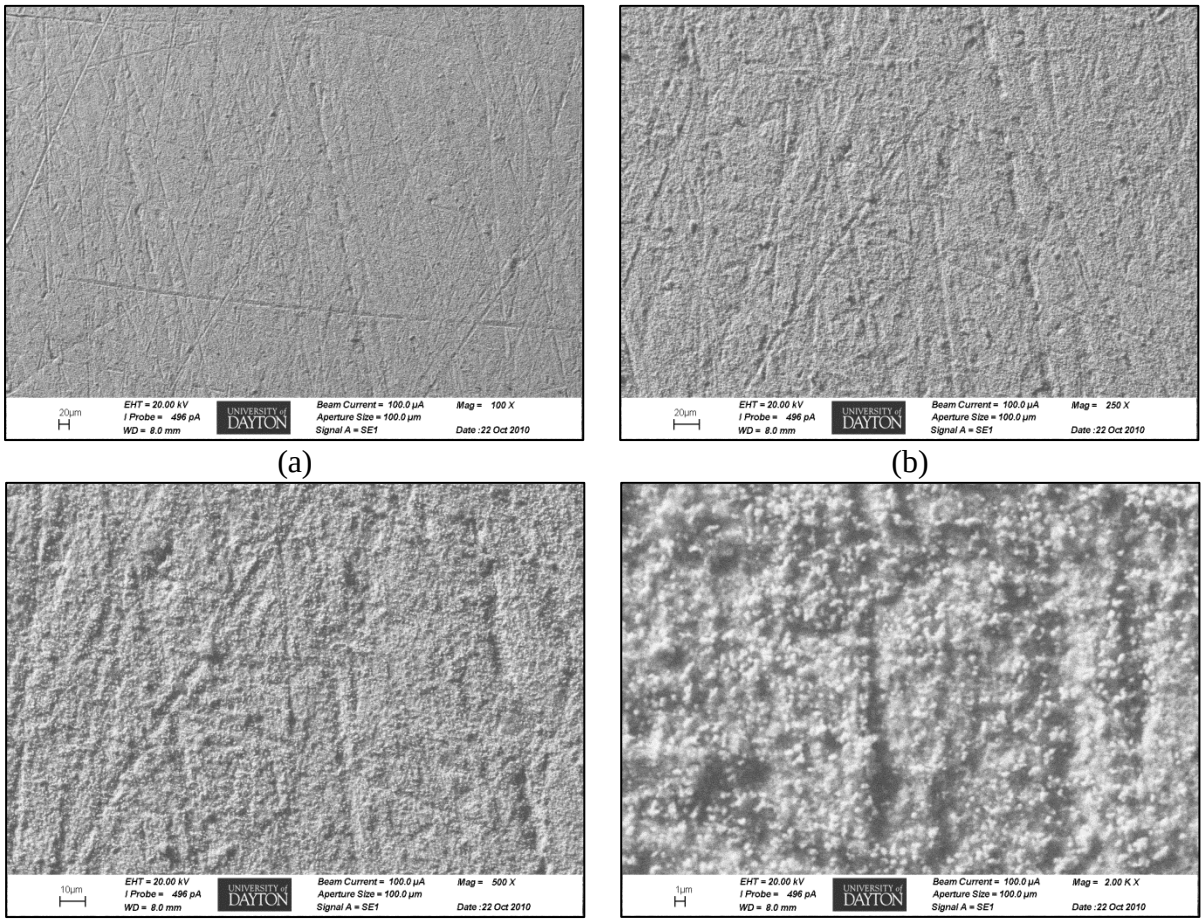


Figure I-4. SEM images of pure silver sample retrieved on 12 months exposure from Kirtland AFB site. (a) 100X magnification (b) 250X magnification, (c) 500X magnification, and (d) 2000X magnification.

Distribution Statement A. Approved for Public Release.

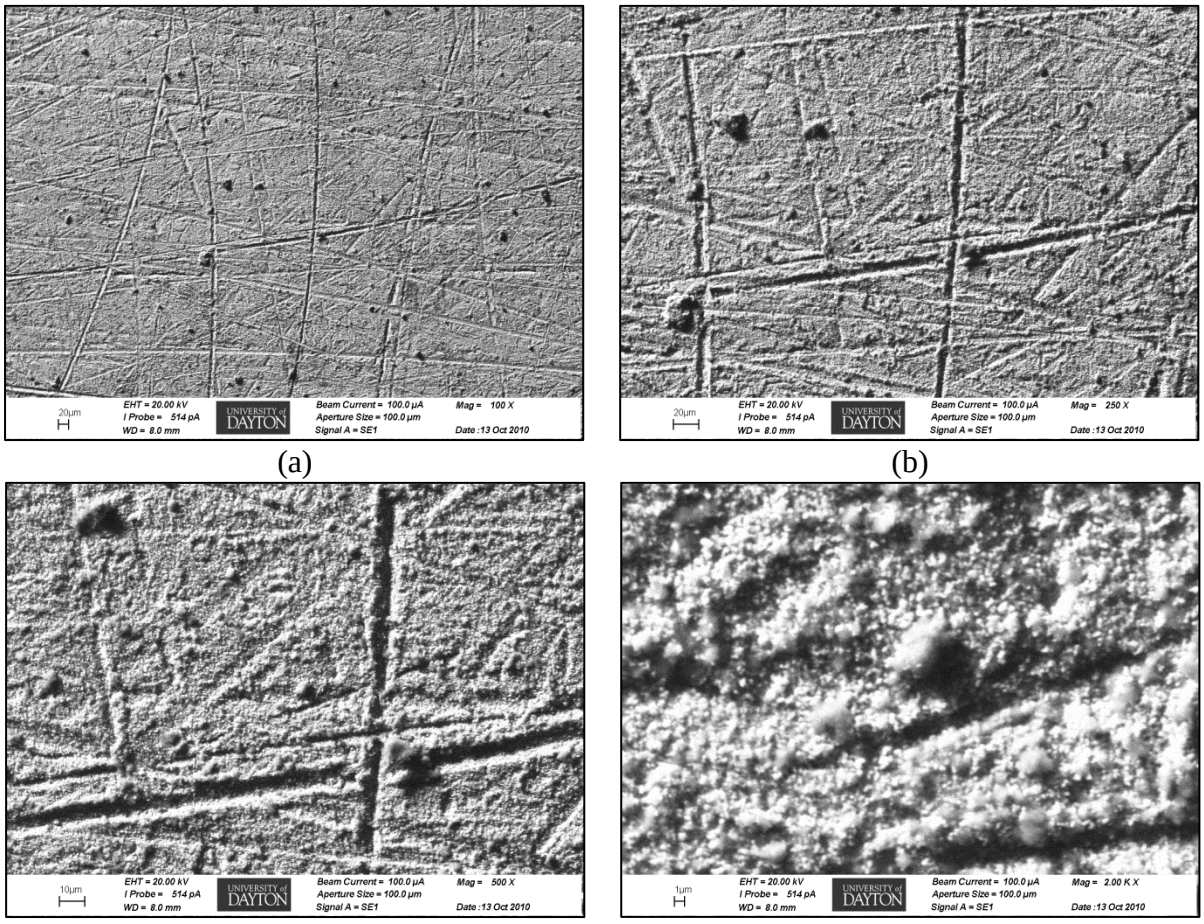


Figure I-5. SEM images of pure silver sample retrieved on 9 months exposure from Kirtland AFB site. (a) 100X magnification (b) 250X magnification, (c) 500X magnification, and (d) 2000X magnification.

Distribution Statement A. Approved for Public Release.

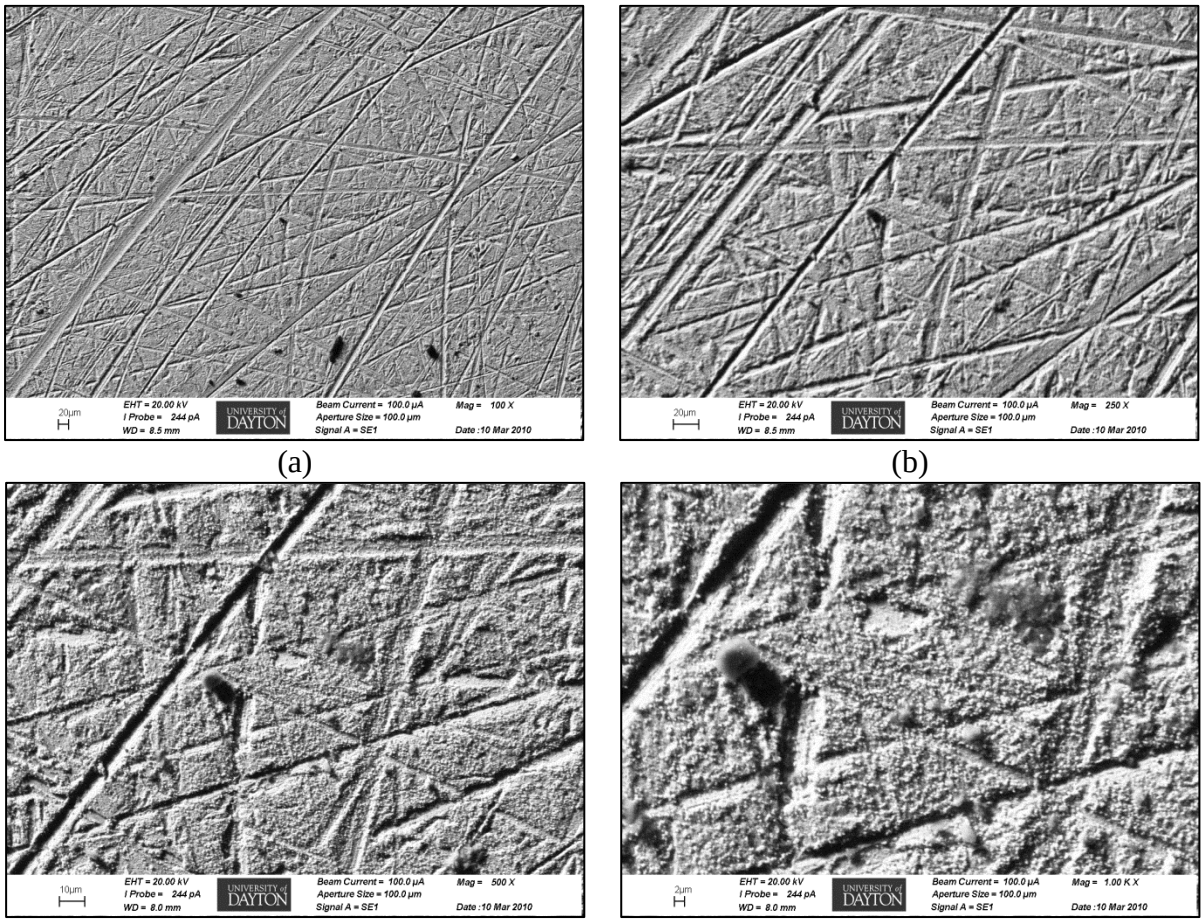


Figure I-6. SEM images of pure silver sample retrieved on 6 months exposure from Kirtland AFB site. (a) 100X magnification (b) 250X magnification, (c) 500X magnification, and (d) 1000X magnification.

Distribution Statement A. Approved for Public Release.

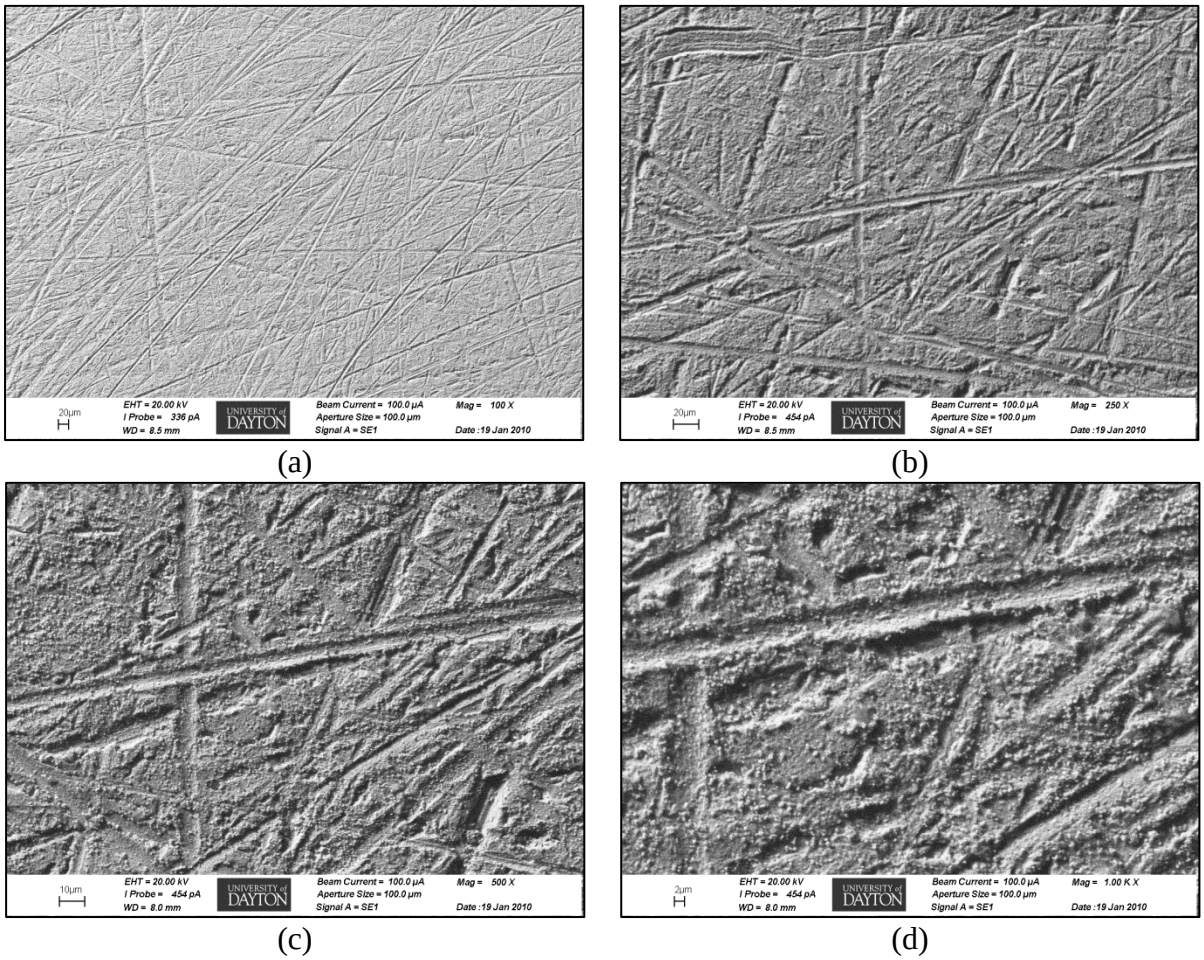
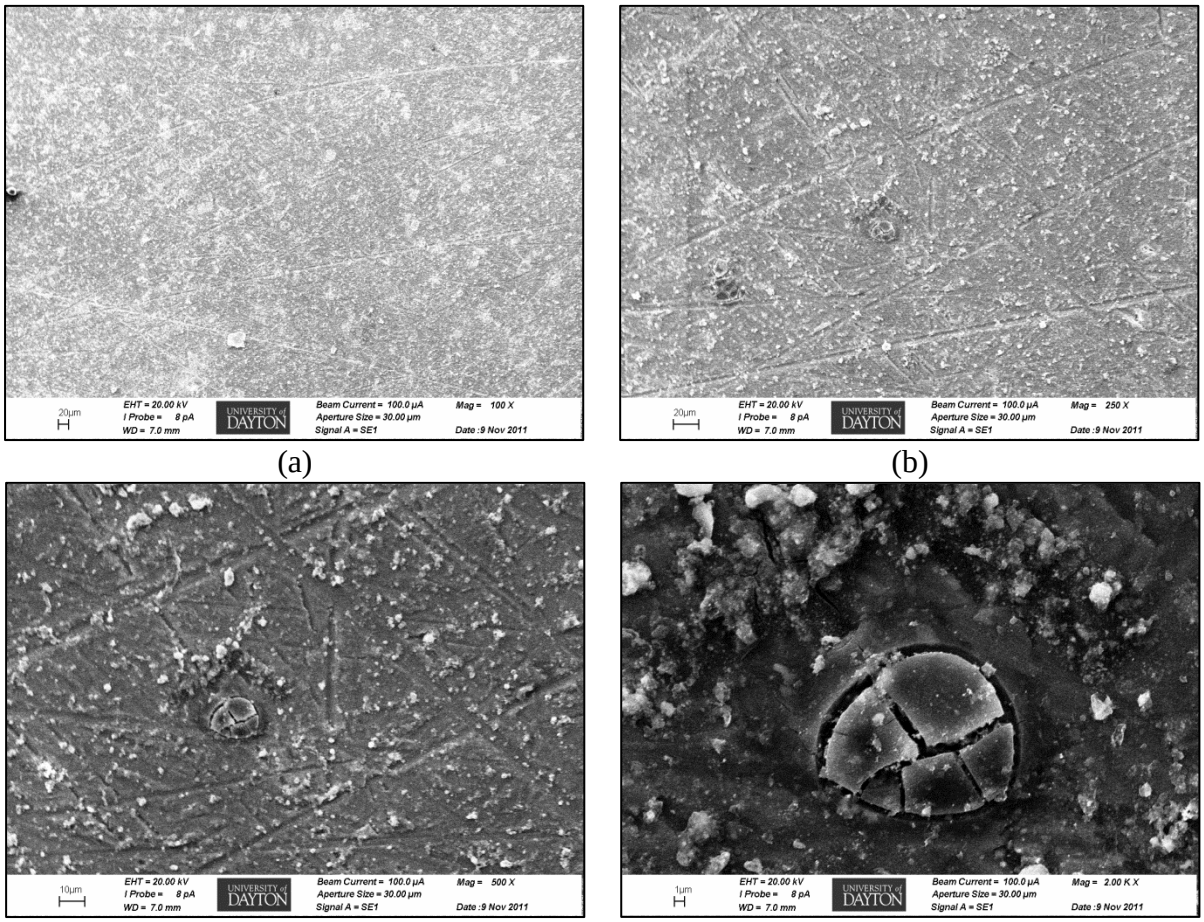


Figure I-7. SEM images of pure silver sample retrieved on 3 months exposure from Kirtland AFB site. (a) 100X magnification (b) 250X magnification, (c) 500X magnification and (d) 1000X magnification.

Distribution Statement A. Approved for Public Release.

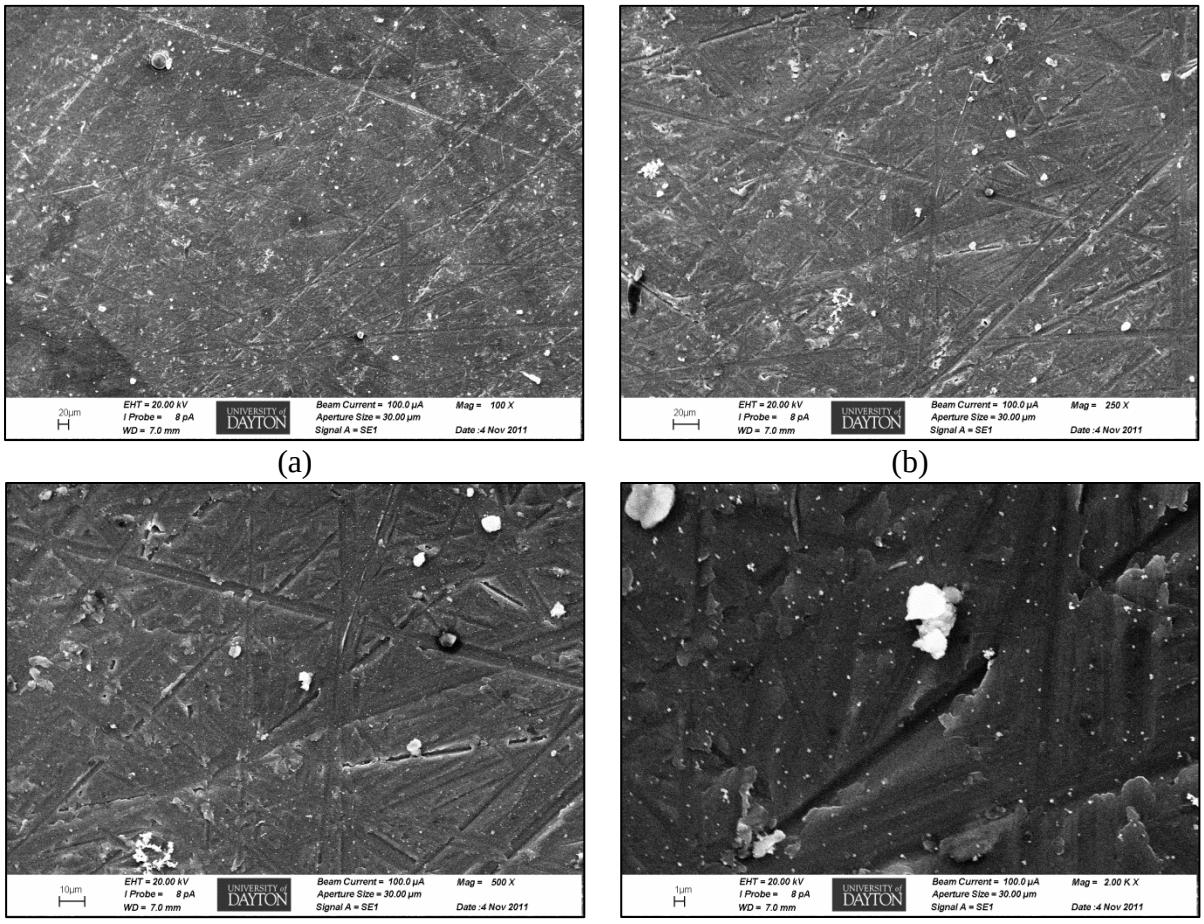


(a) (b)

(c) (d)

Figure I-8. SEM images of aluminum alloy 7075 sample retrieved on 24 months exposure from Kirtland AFB site. (a) 100X magnification (b) 250X magnification, (c) 500X magnification, and (d) 2000X magnification.

Distribution Statement A. Approved for Public Release.



(a) (b)

(c) (d)

Figure I-9. SEM images of aluminum alloy 7075 sample retrieved on 21 months exposure from Kirtland AFB site. (a) 100X magnification (b) 250X magnification, (c) 500X magnification, and (d) 2000X magnification.

Distribution Statement A. Approved for Public Release.

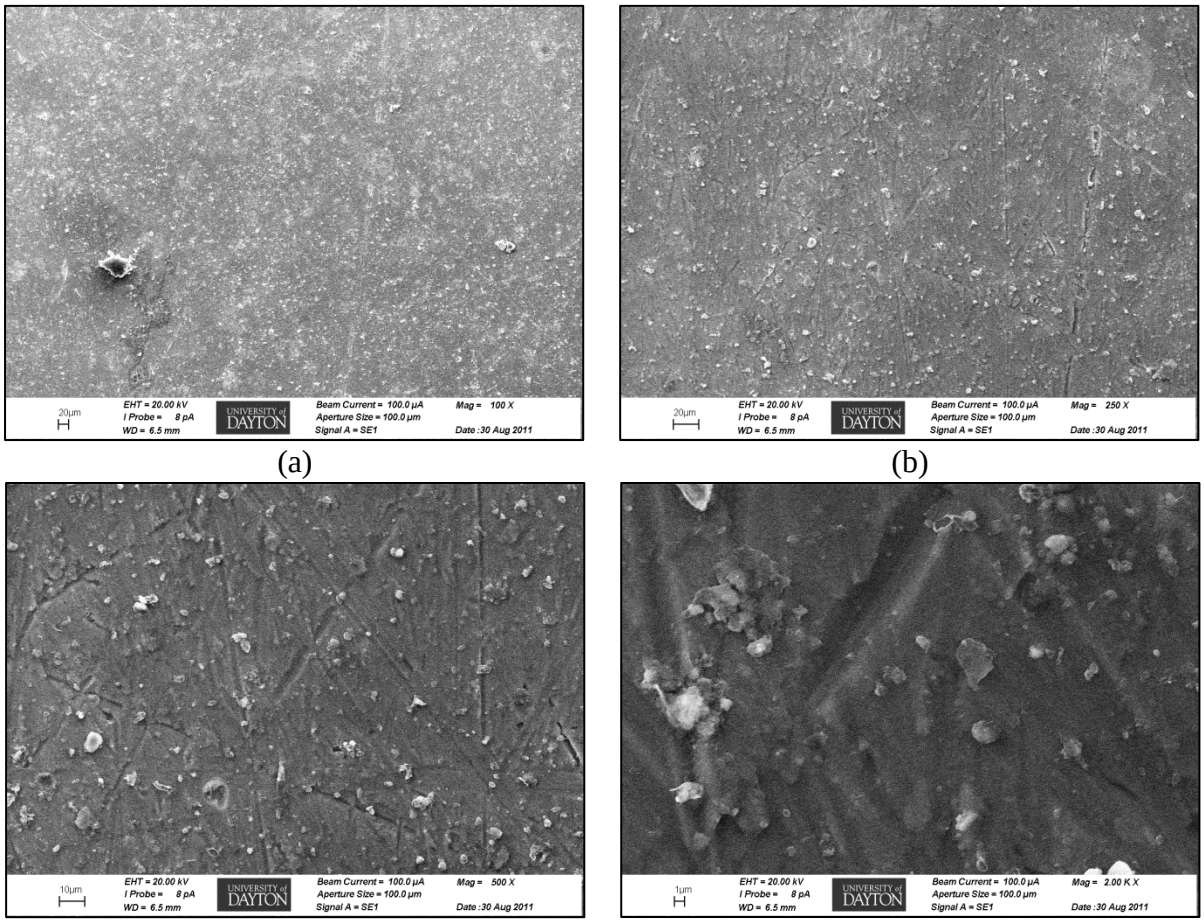


Figure I-10. SEM images of aluminum alloy 7075 sample retrieved on 18 months exposure from Kirtland AFB site. (a) 100X magnification (b) 250X magnification, (c) 500X magnification, and (d) 2000X magnification.

Distribution Statement A. Approved for Public Release.

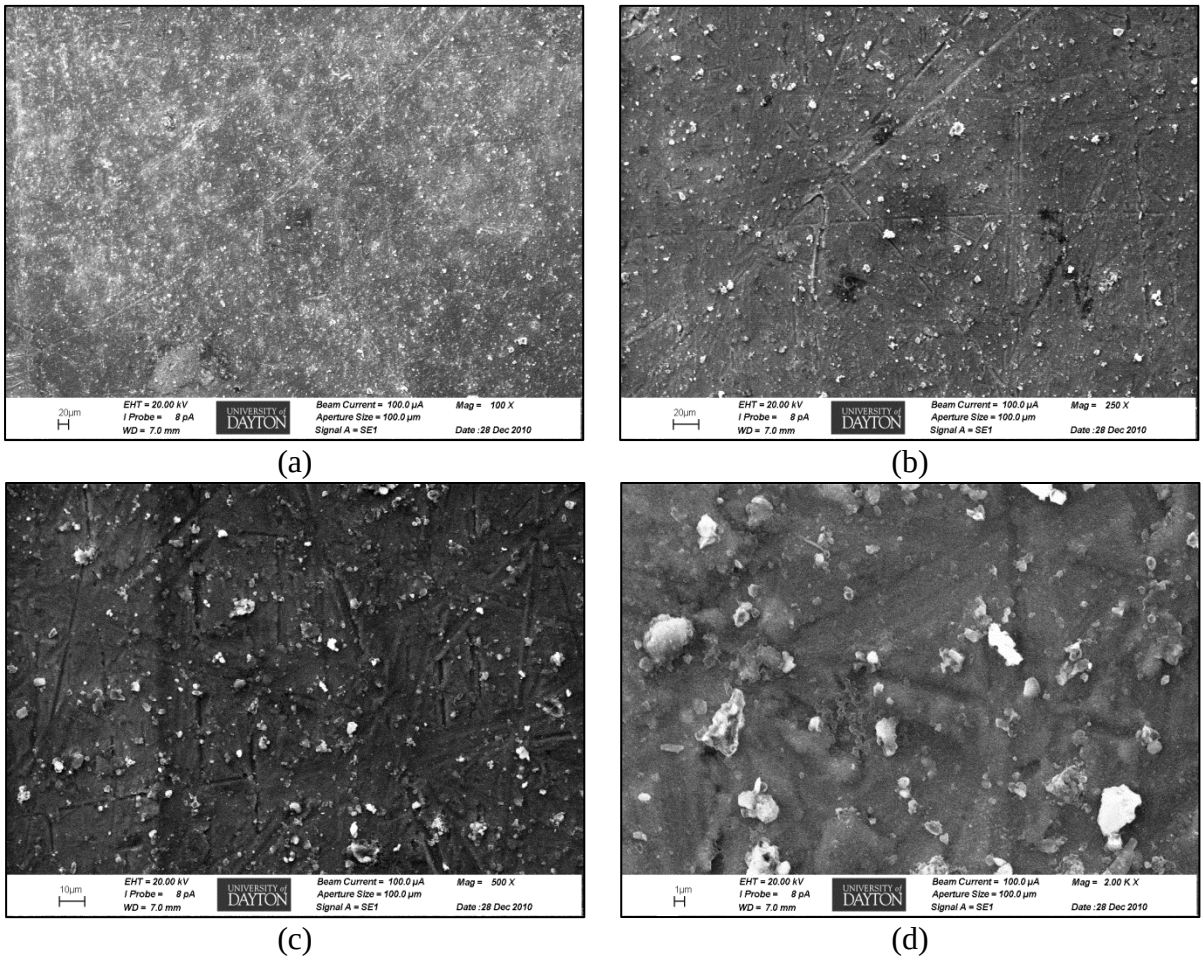


Figure I-11. SEM images of aluminum alloy 7075 sample retrieved on 15 months exposure from Kirtland AFB site. (a) 100X magnification (b) 250X magnification, (c) 500X magnification, and (d) 2000X magnification.

Distribution Statement A. Approved for Public Release.

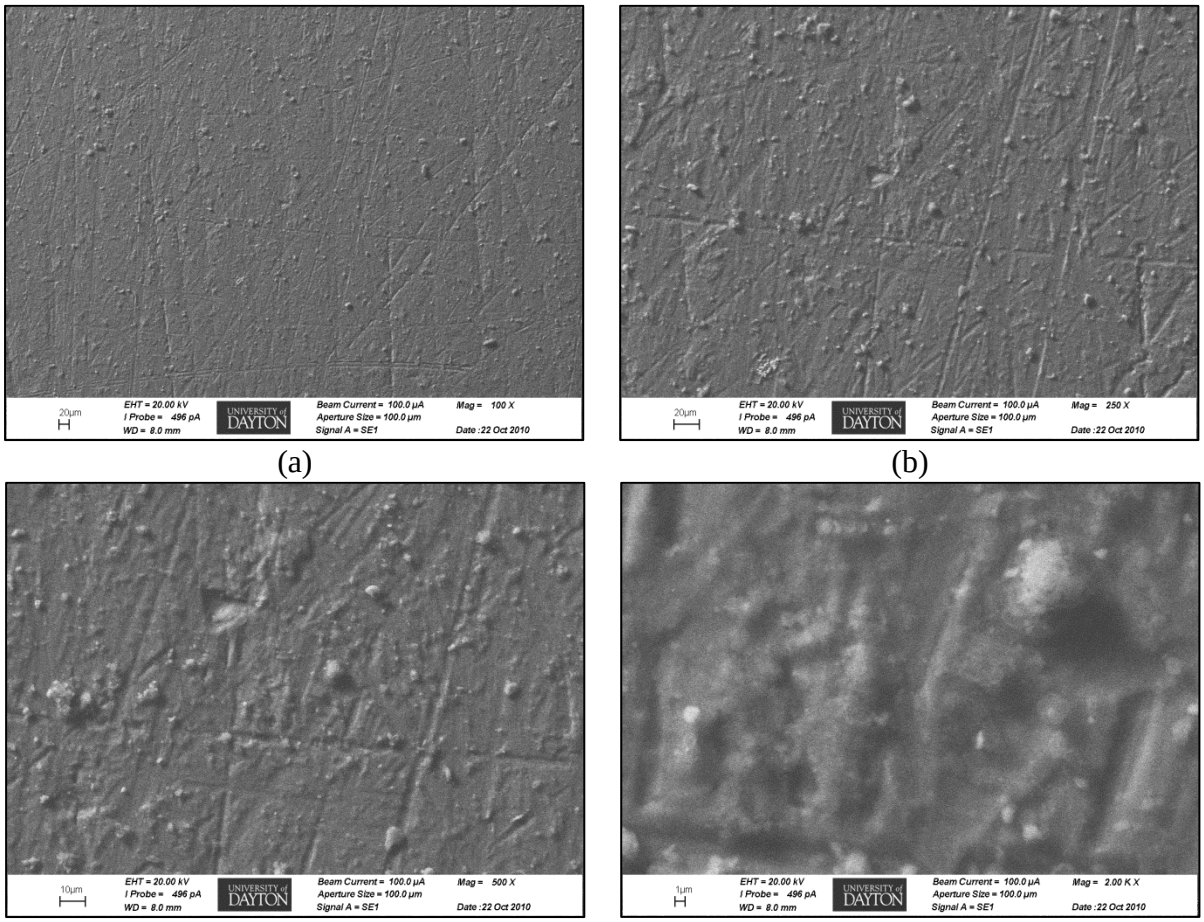


Figure I-12. SEM images of aluminum alloy 7075 sample retrieved on 12 months exposure from Kirtland AFB site. (a) 100X magnification (b) 250X magnification, (c) 500X magnification, and (d) 2000X magnification.

Distribution Statement A. Approved for Public Release.

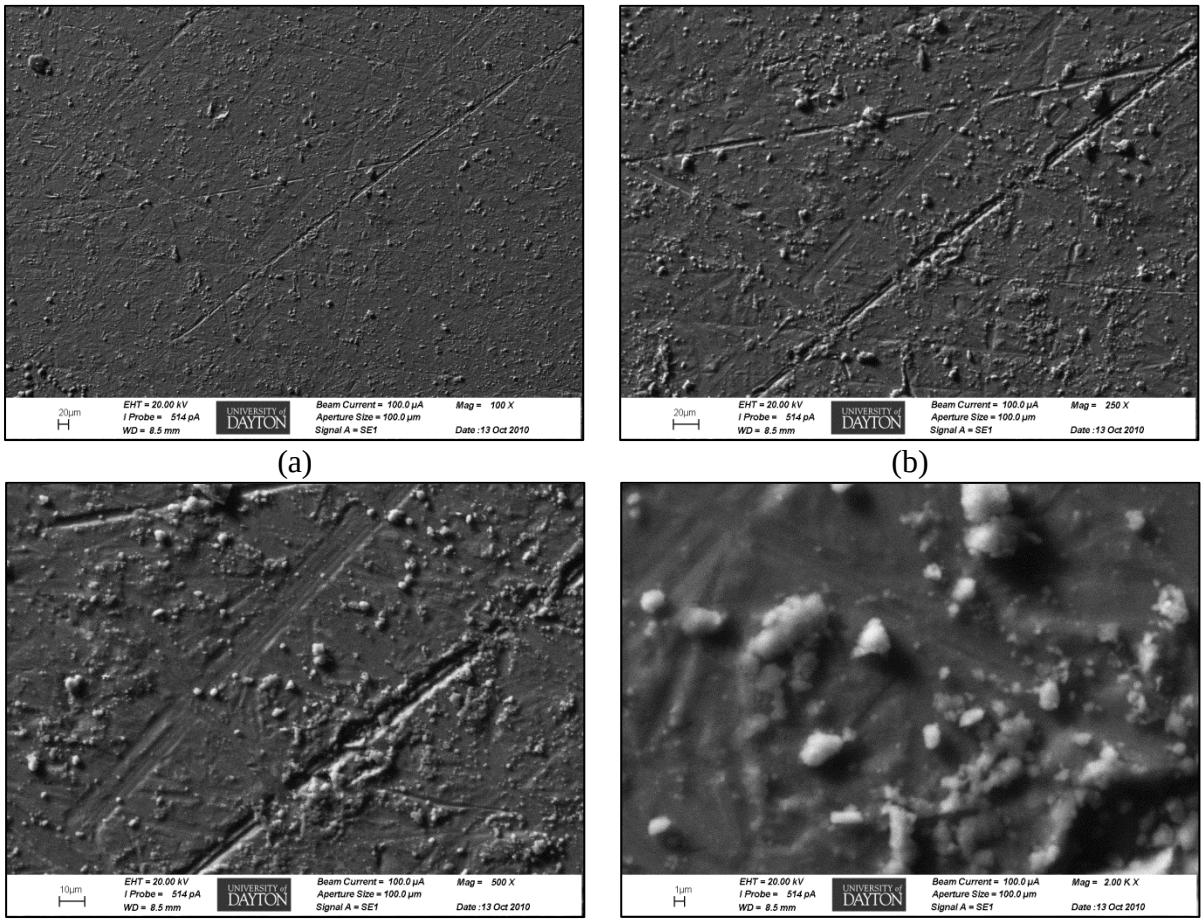
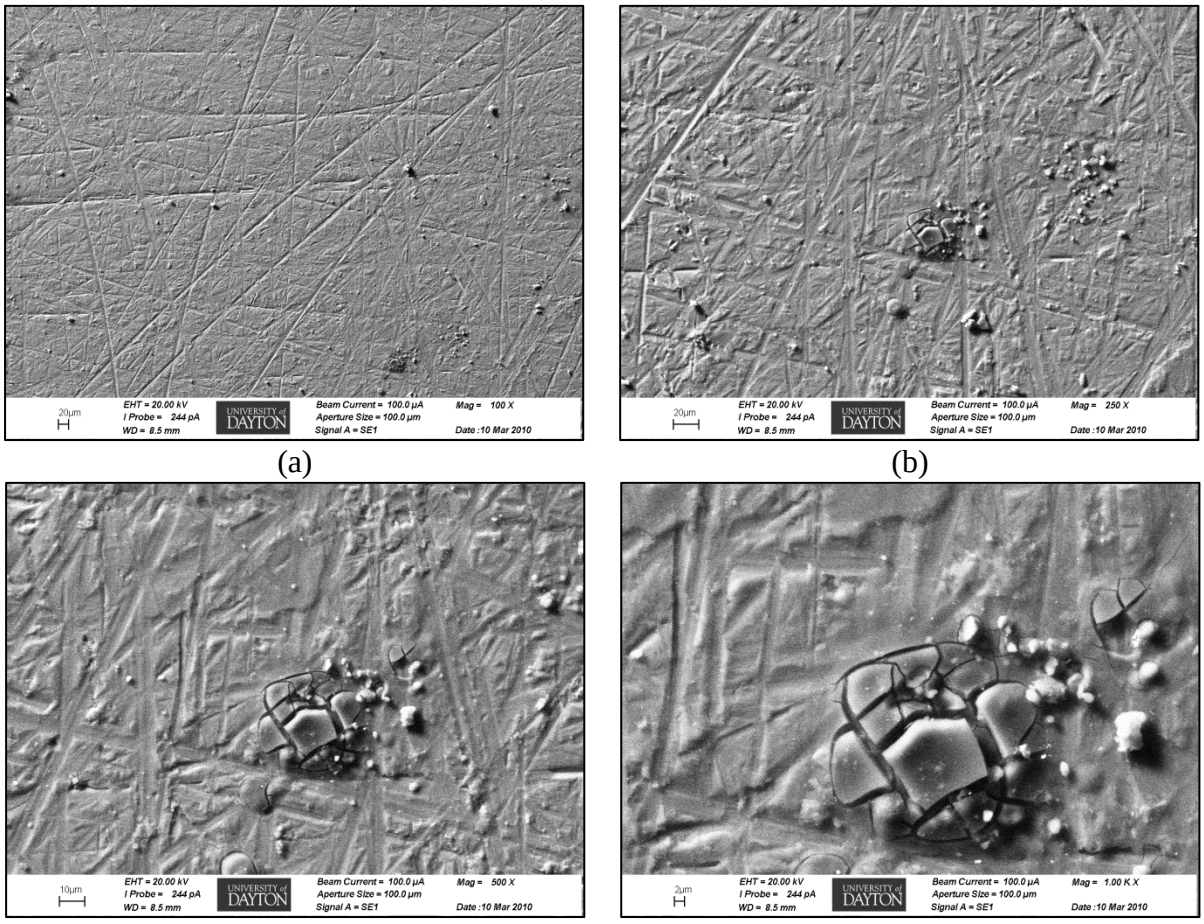


Figure I-13. SEM images of aluminum alloy 7075 sample retrieved on 9 months exposure from Kirtland AFB site. (a) 100X magnification (b) 250X magnification, (c) 500X magnification, and (d) 2000X magnification.

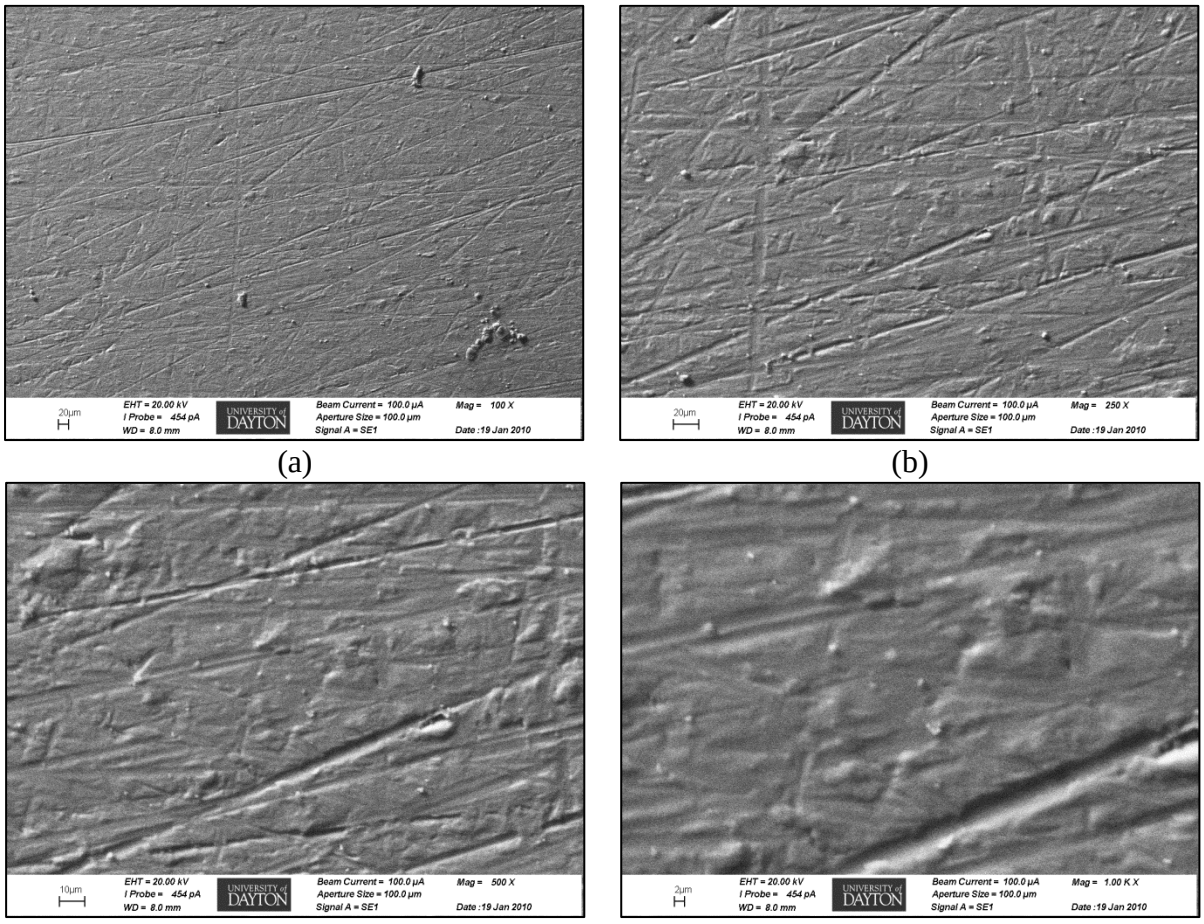
Distribution Statement A. Approved for Public Release.



(c)

Figure I-14. SEM images of aluminum alloy 7075 sample retrieved on 6 months exposure from Kirtland AFB site. (a) 100X magnification (b) 250X magnification, (c) 500X magnification,. and (d) 100X magnification

Distribution Statement A. Approved for Public Release.



(c)

Figure I-15. SEM images of aluminum alloy 7075 sample retrieved on 3 months exposure from Kirtland AFB site. (a) 100X magnification (b) 250X magnification, (c) 500X magnification, and (d) 1000X magnification.

Distribution Statement A. Approved for Public Release.

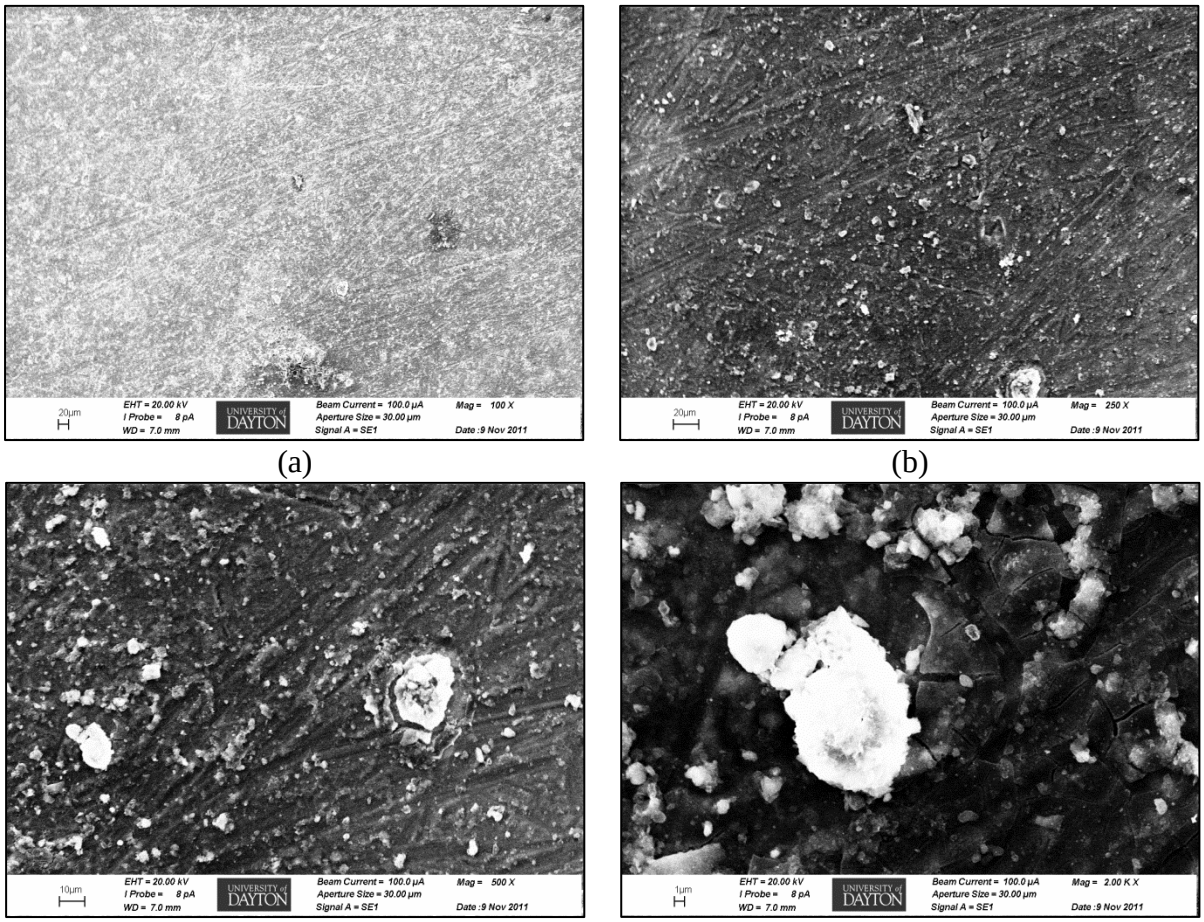
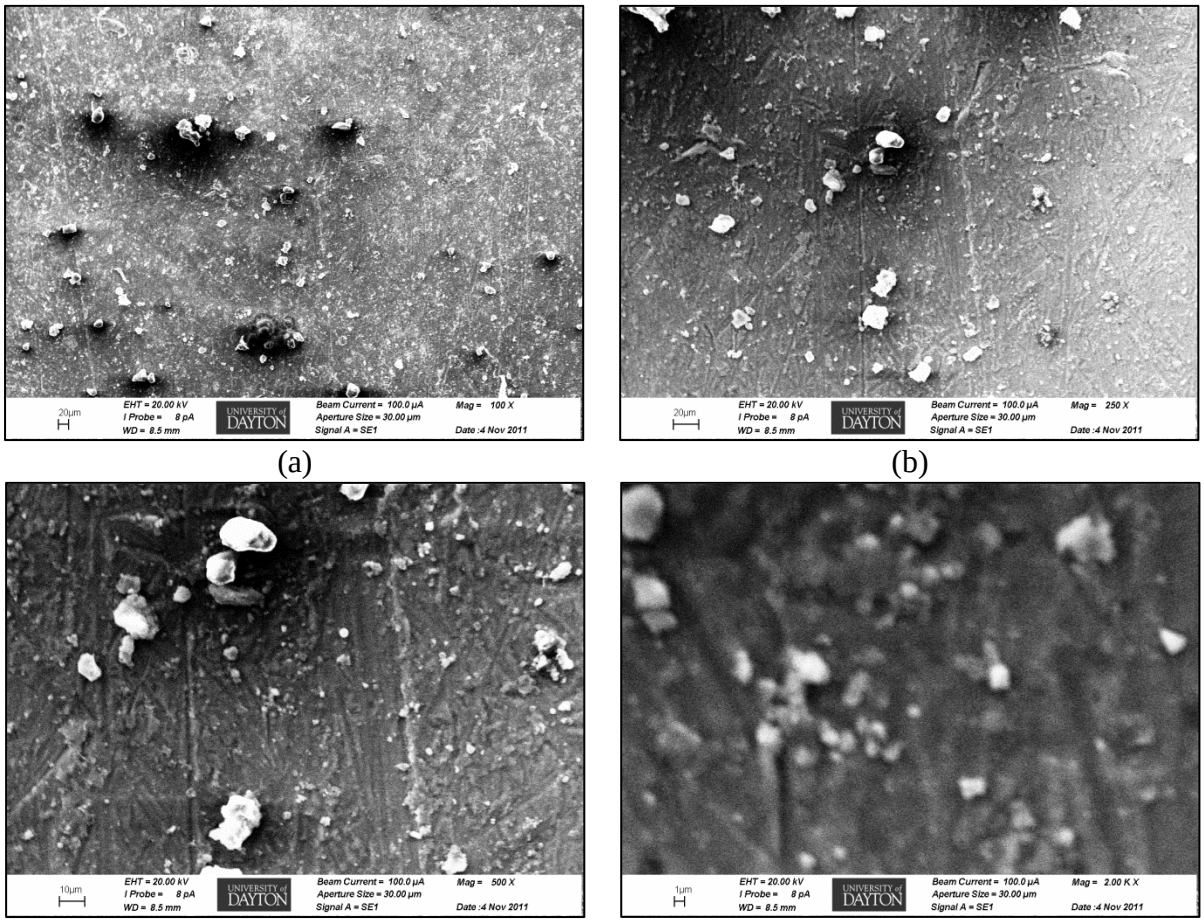


Figure I-16. SEM images of aluminum alloy 6061 sample retrieved on 24 months exposure from Kirtland AFB site. (a) 100X magnification (b) 250X magnification, (c) 500X magnification, and (d) 2000X magnification.

Distribution Statement A. Approved for Public Release.



(a) (b)

(c) (d)

Figure I-17. SEM images of aluminum alloy 6061 sample retrieved on 21 months exposure from Kirtland AFB site. (a) 100X magnification (b) 250X magnification, (c) 500X magnification, and (d) 2000X magnification

.

Distribution Statement A. Approved for Public Release.

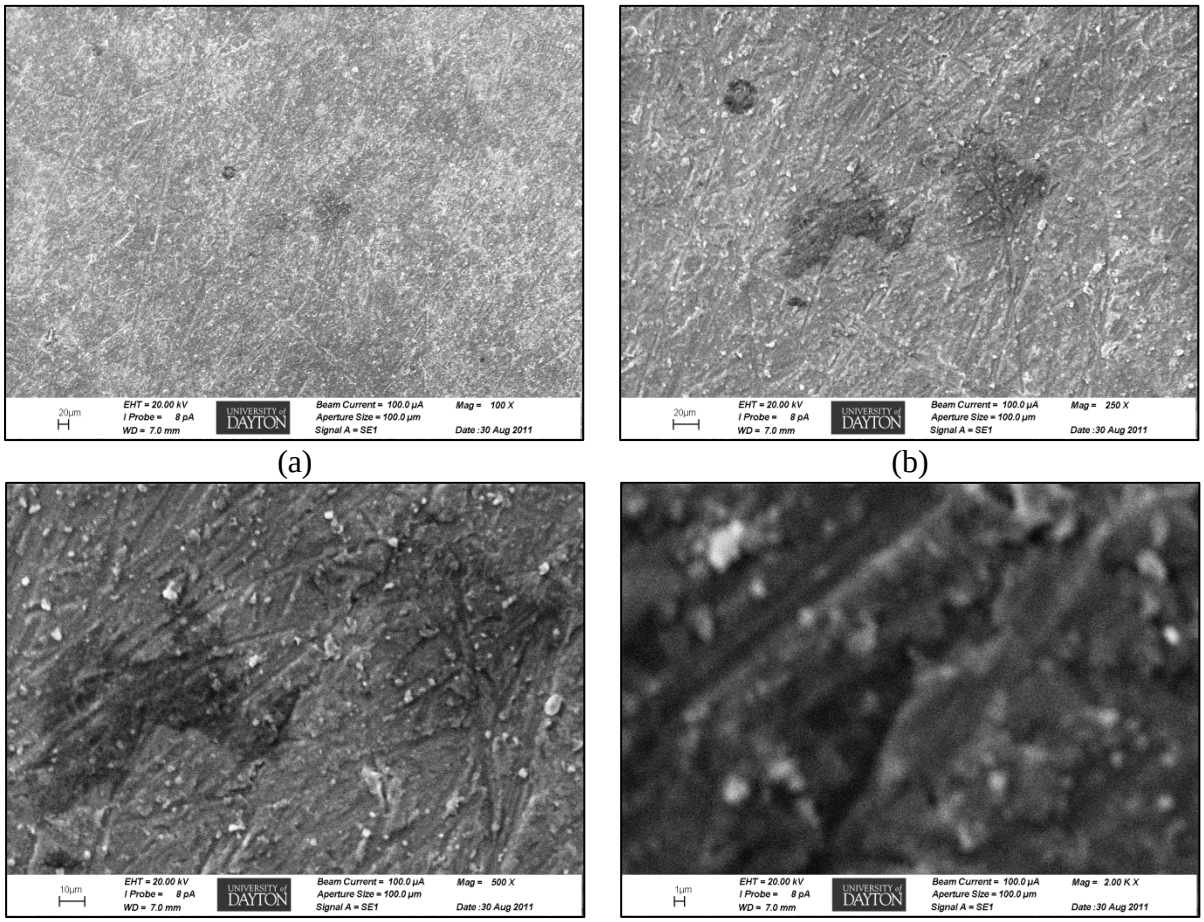


Figure I-18. SEM images of aluminum alloy 6061 sample retrieved on 18 months exposure from Kirtland AFB site. (a) 100X magnification (b) 250X magnification, (c) 500X magnification, and (d) 2000X magnification

Distribution Statement A. Approved for Public Release.

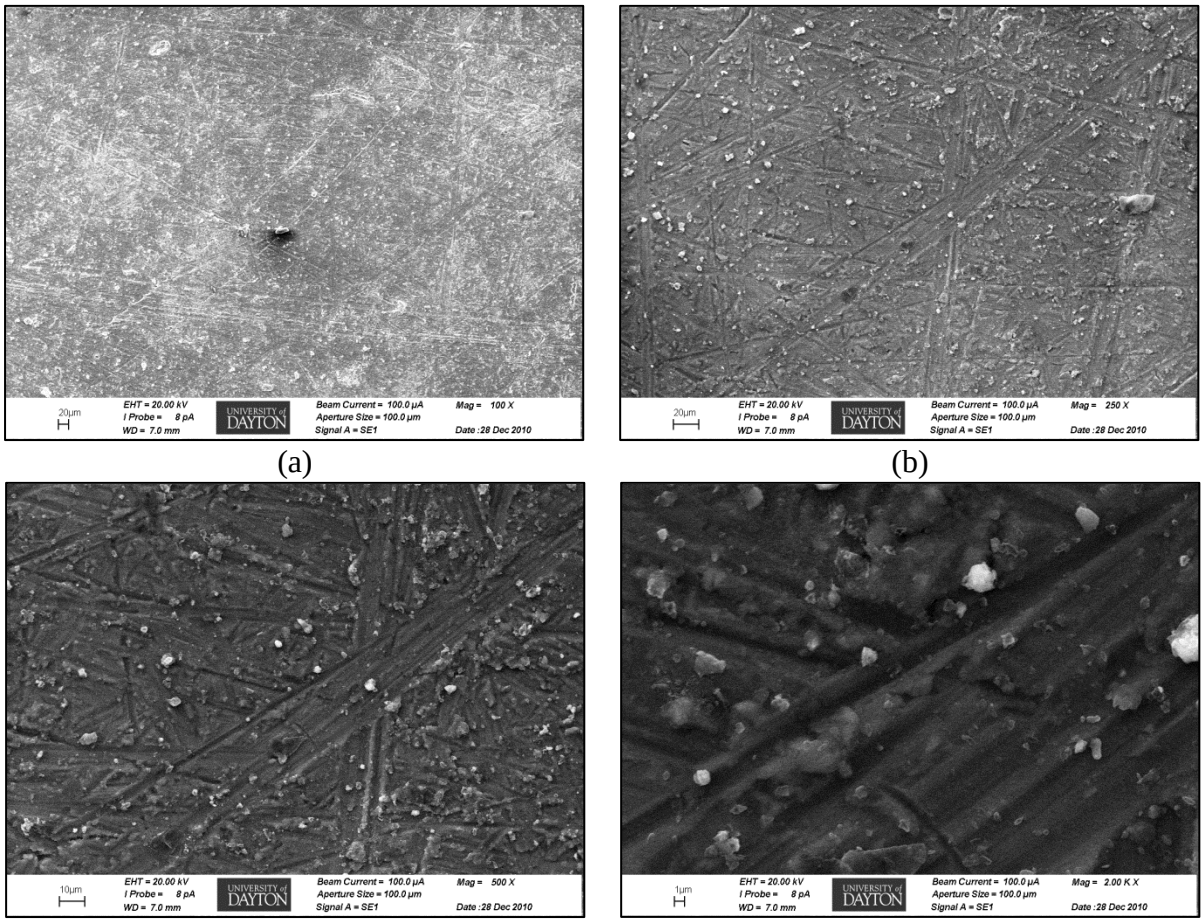


Figure I-19. SEM images of aluminum alloy 6061 sample retrieved on 15 months exposure from Kirtland AFB site. (a) 100X magnification (b) 250X magnification, (c) 500X magnification, and (d) 2000X magnification

Distribution Statement A. Approved for Public Release.

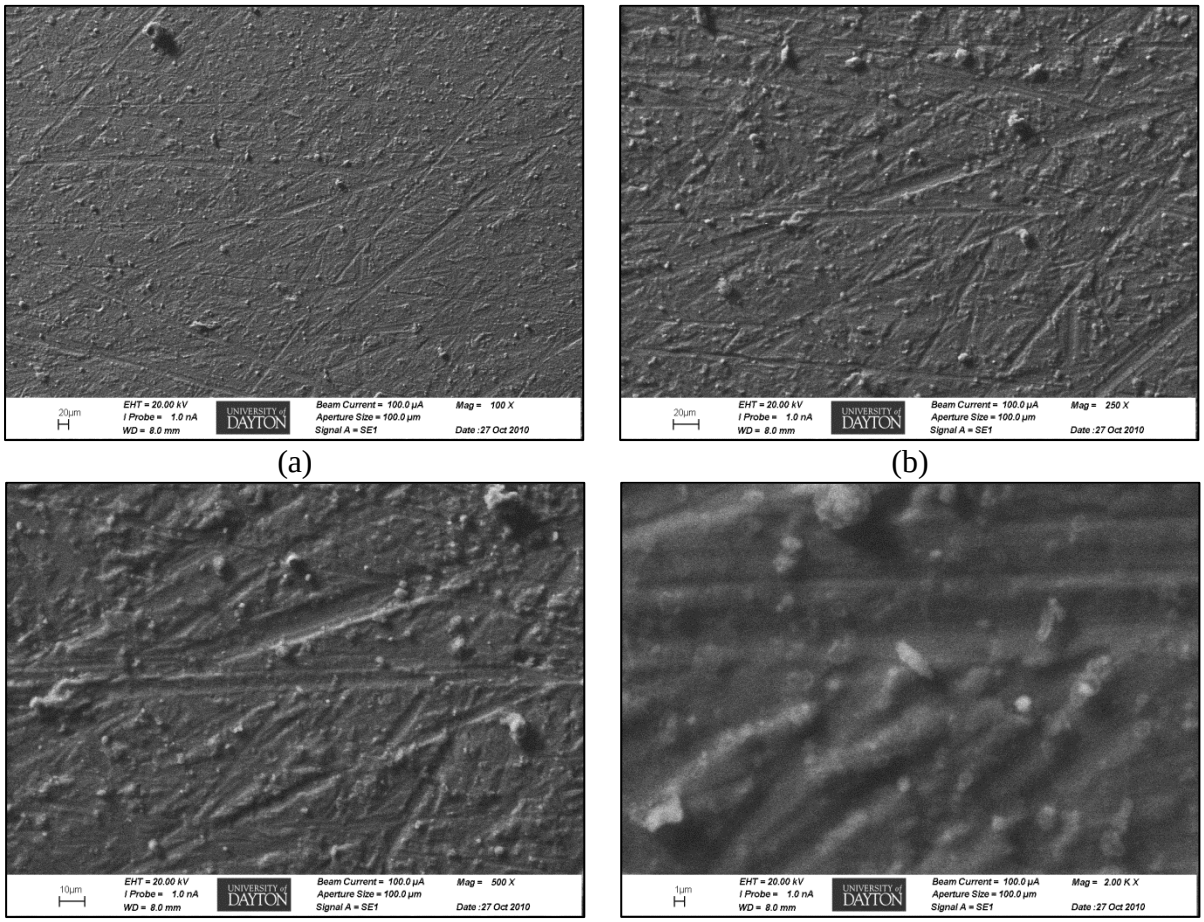


Figure I-20. SEM images of aluminum alloy 6061 sample retrieved on 12 months exposure from Kirtland AFB site. (a) 100X magnification (b) 250X magnification, (c) 500X magnification, and (d) 2000X magnification.

Distribution Statement A. Approved for Public Release.

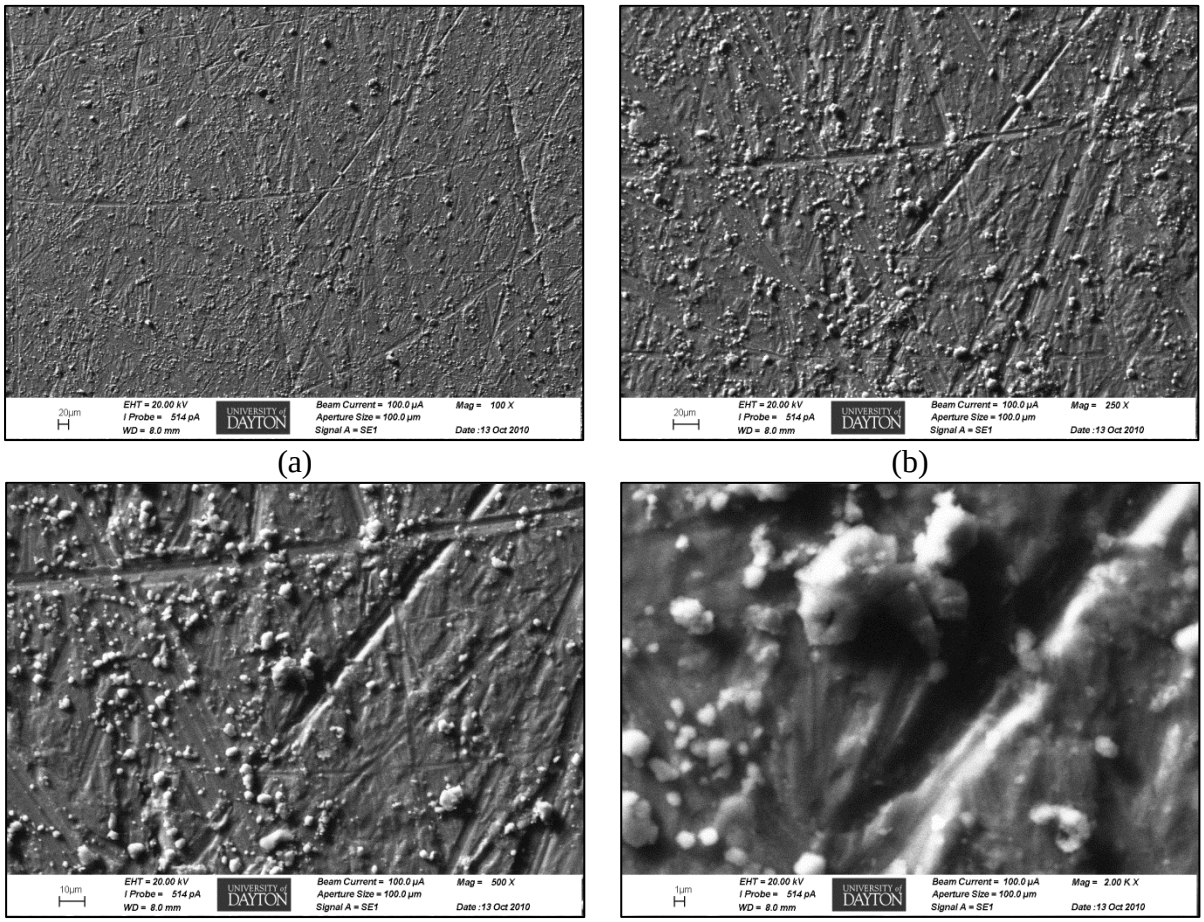
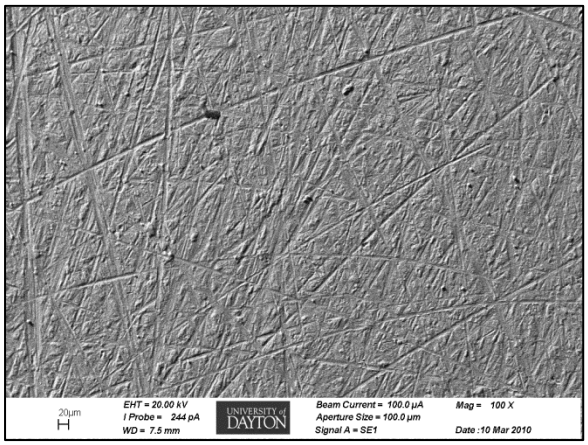
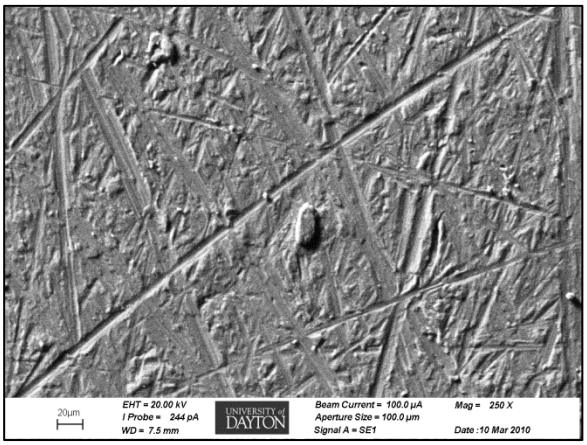


Figure I-21. SEM images of aluminum alloy 6061 sample retrieved on 9 months exposure from Kirtland AFB site. (a) 100X magnification (b) 250X magnification, (c) 500X magnification, and (d) 2000X magnification.

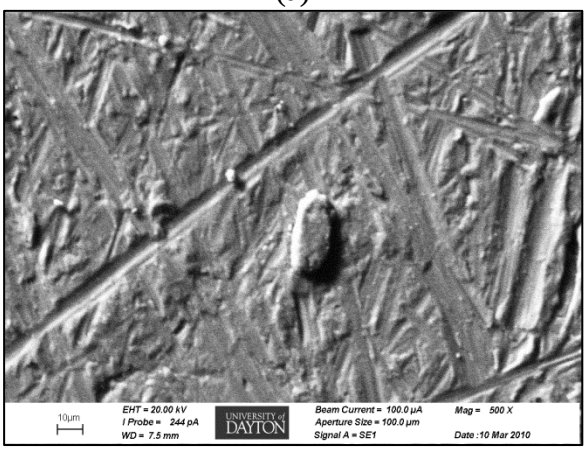
Distribution Statement A. Approved for Public Release.



(a)



(b)



(c)

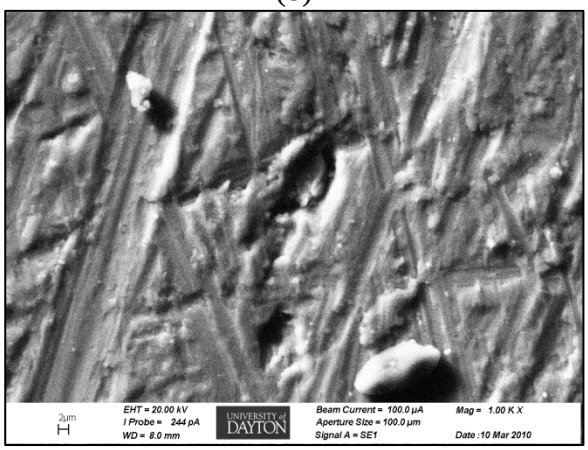


Figure I-22. SEM images of aluminum alloy 6061 sample retrieved on 6 months exposure from Kirtland AFB site. (a) 100X magnification (b) 250X magnification, (c) 500X magnification. , and (d) 1000X magnification.

.

Distribution Statement A. Approved for Public Release.

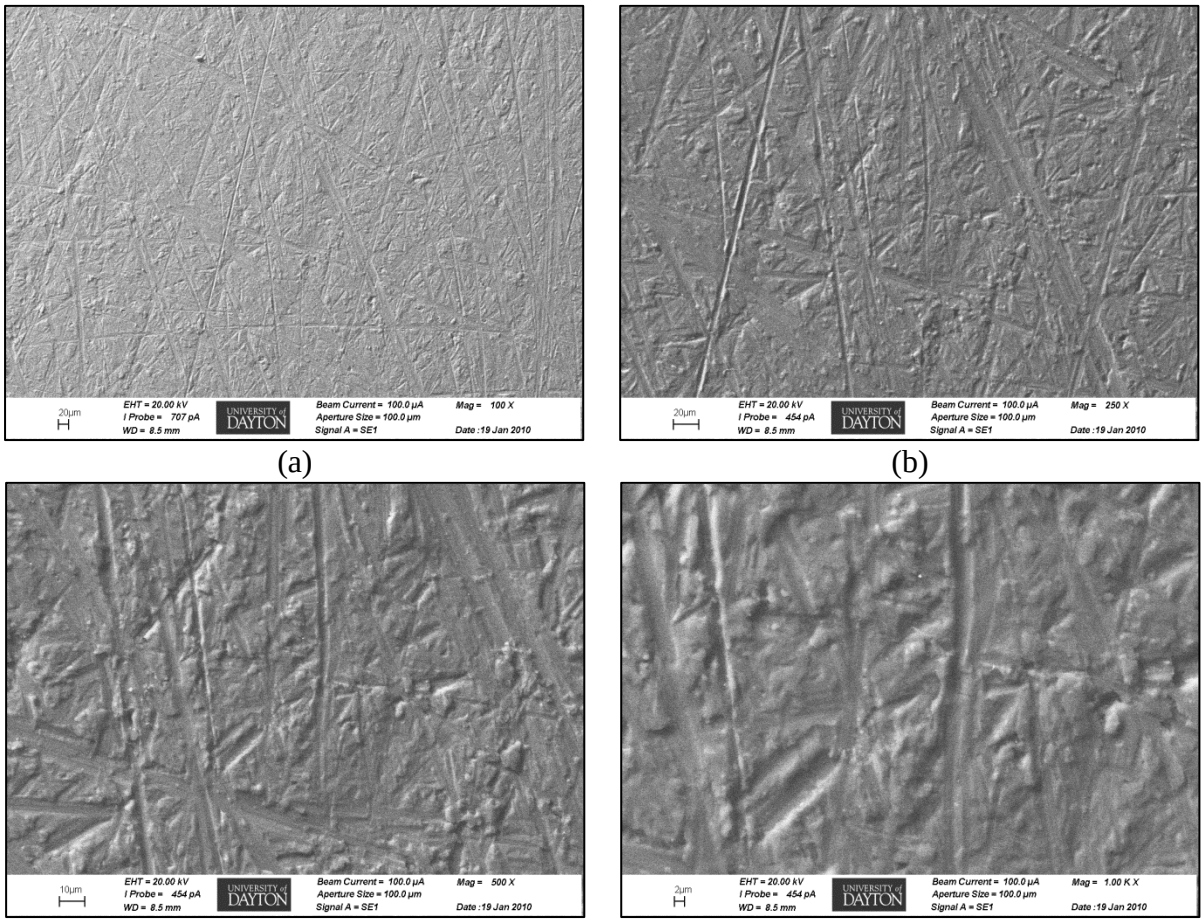


Figure I-23. SEM images of aluminum alloy 6061 sample retrieved on 3 months exposure from Kirtland AFB site. (a) 100X magnification (b) 250X magnification, (c) 500X magnification, and (d) 1000X magnification.

Distribution Statement A. Approved for Public Release.

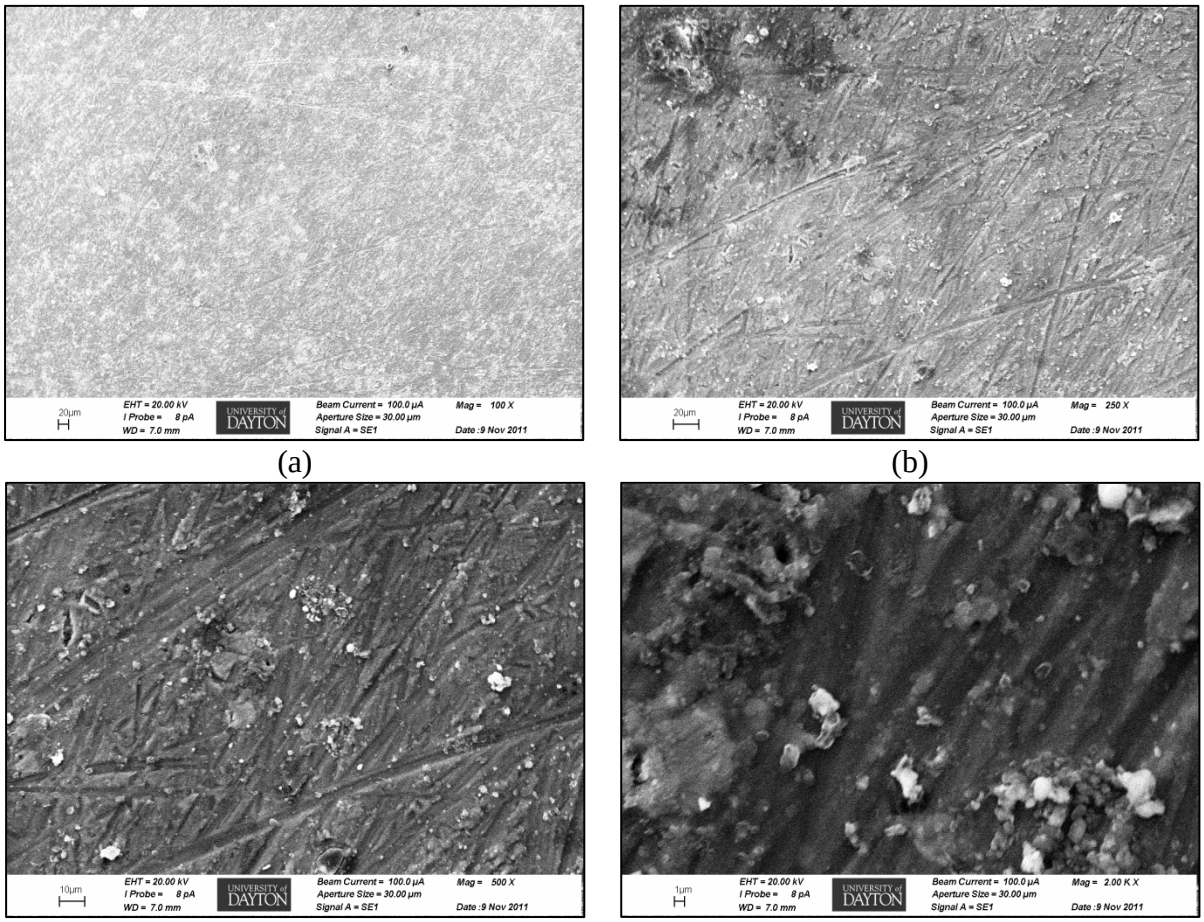
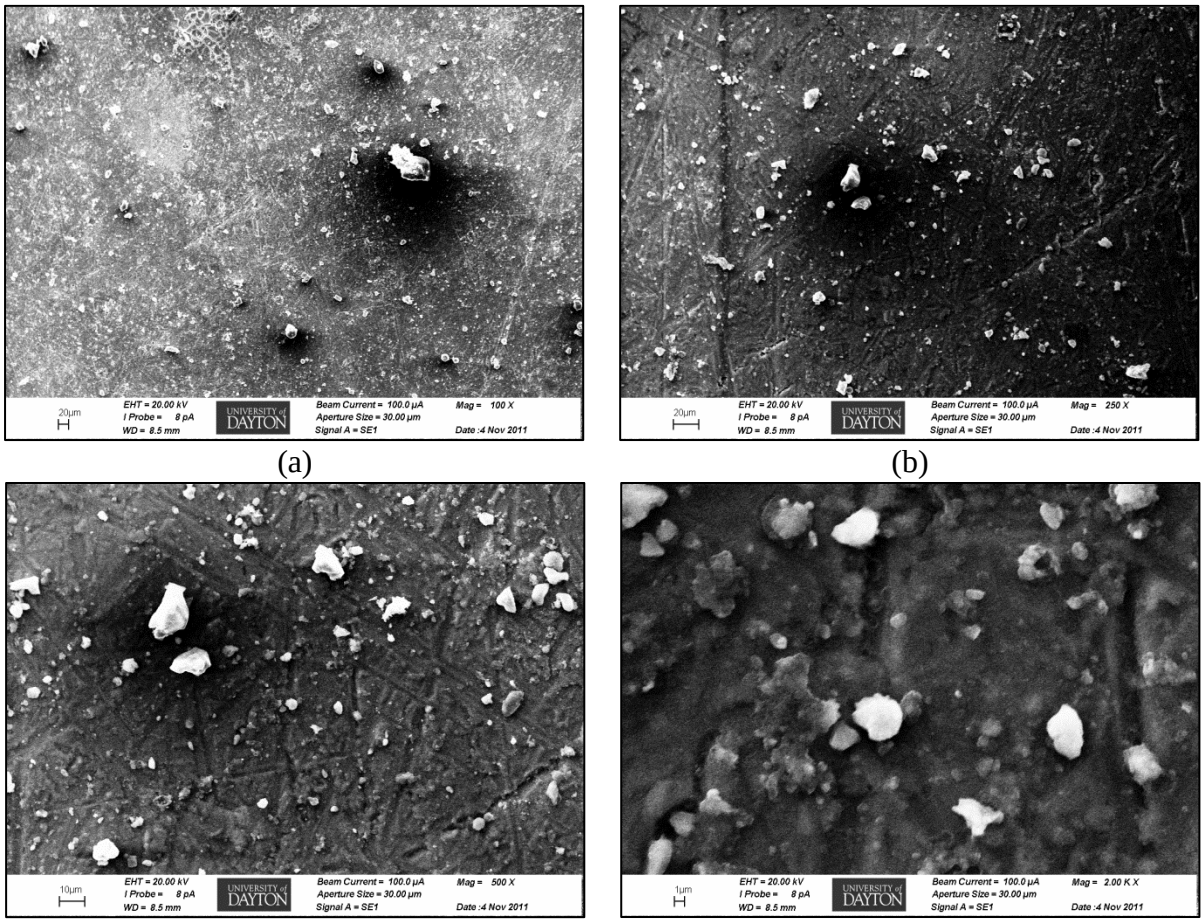


Figure I-24. SEM images of aluminum alloy 2024 sample retrieved on 24 months exposure from Kirtland AFB site. (a) 100X magnification (b) 250X magnification, (c) 500X magnification, and (d) 2000X magnification.

.

Distribution Statement A. Approved for Public Release.



(a) (b)

(c) (d)

Figure I-25. SEM images of aluminum alloy 2024 sample retrieved on 21 months exposure from Kirtland AFB site. (a) 100X magnification (b) 250X magnification, (c) 500X magnification, and (d) 2000X magnification.

Distribution Statement A. Approved for Public Release.

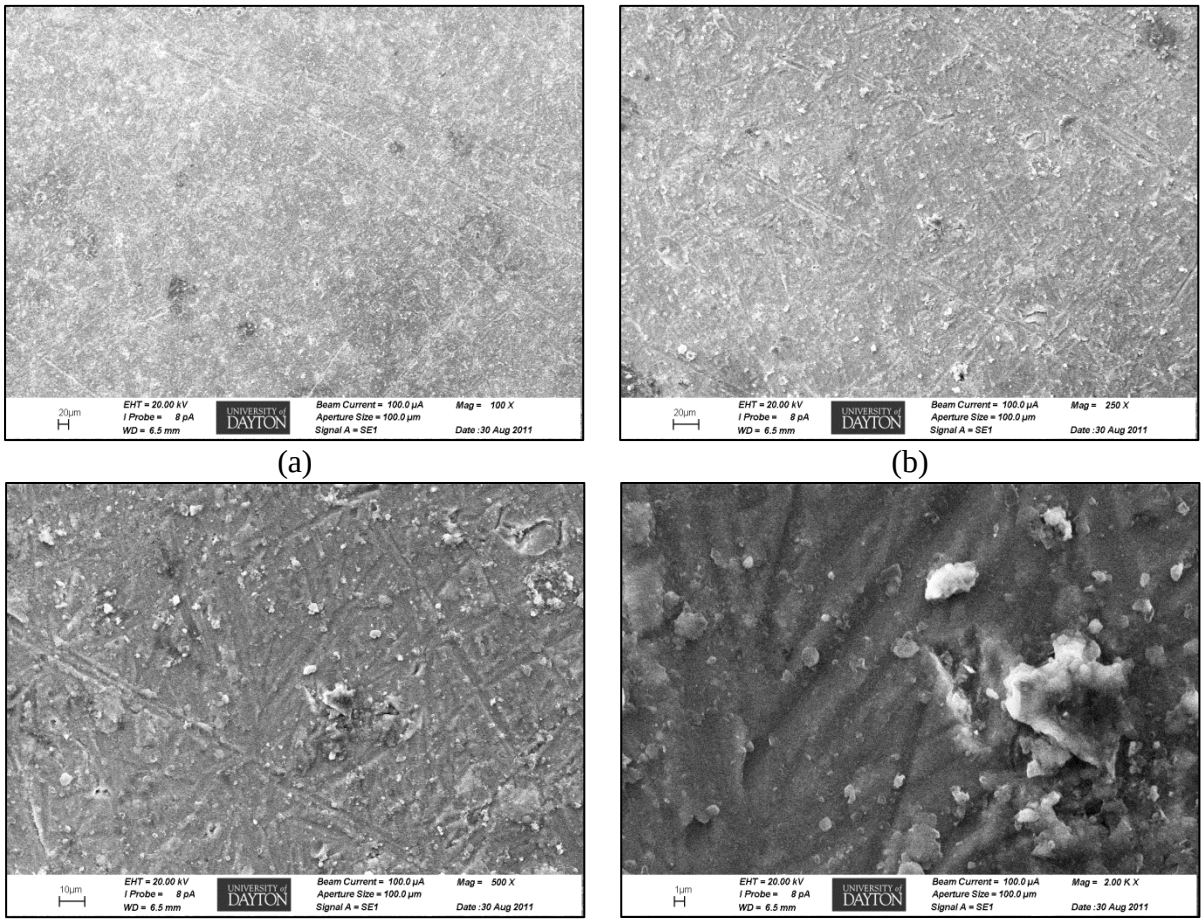


Figure I-26. SEM images of aluminum alloy 2024 sample retrieved on 18 months exposure from Kirtland AFB site. (a) 100X magnification (b) 250X magnification, (c) 500X magnification, and (d) 2000X magnification.

Distribution Statement A. Approved for Public Release.

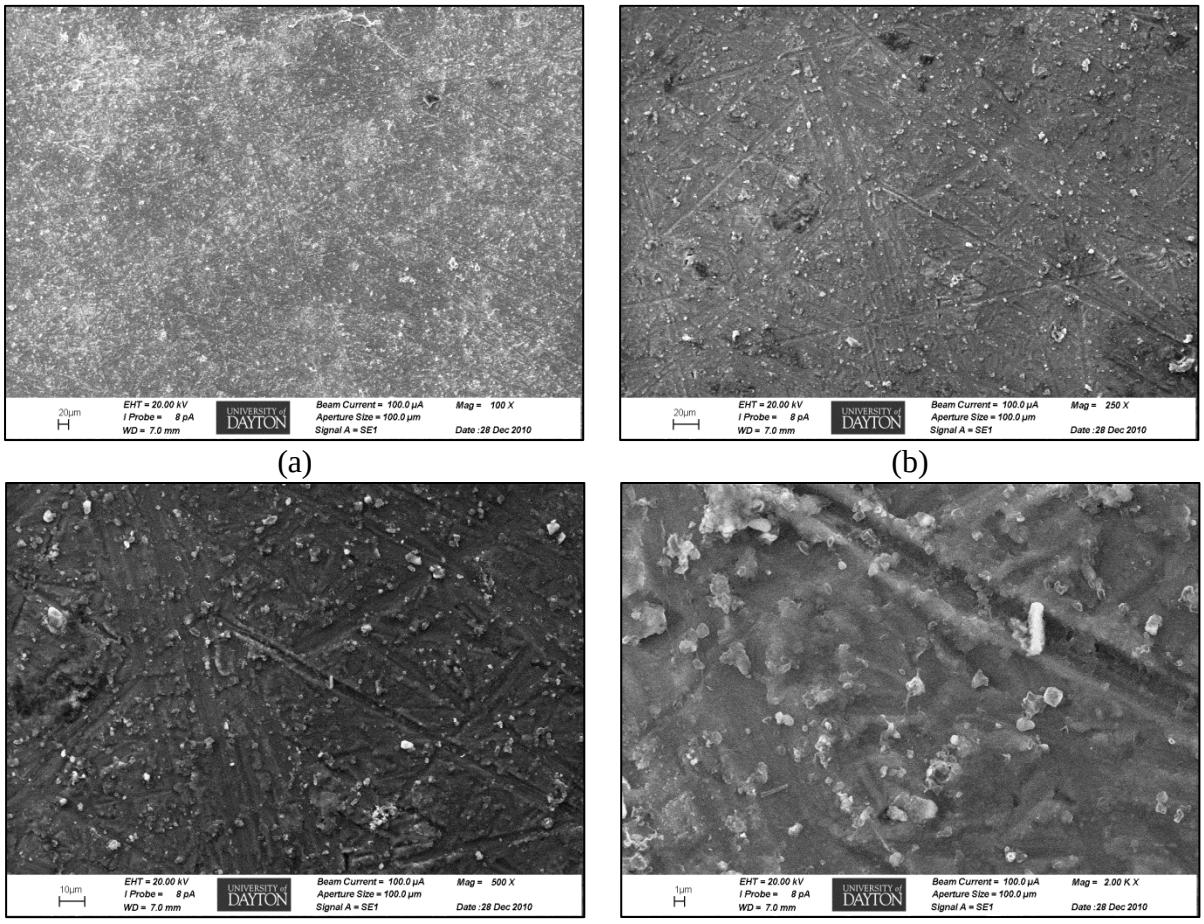


Figure I-27. SEM images of aluminum alloy 2024 sample retrieved on 15 months exposure from Kirtland AFB site. (a) 100X magnification (b) 250X magnification, (c) 500X magnification, and (d) 2000X magnification.

Distribution Statement A. Approved for Public Release.

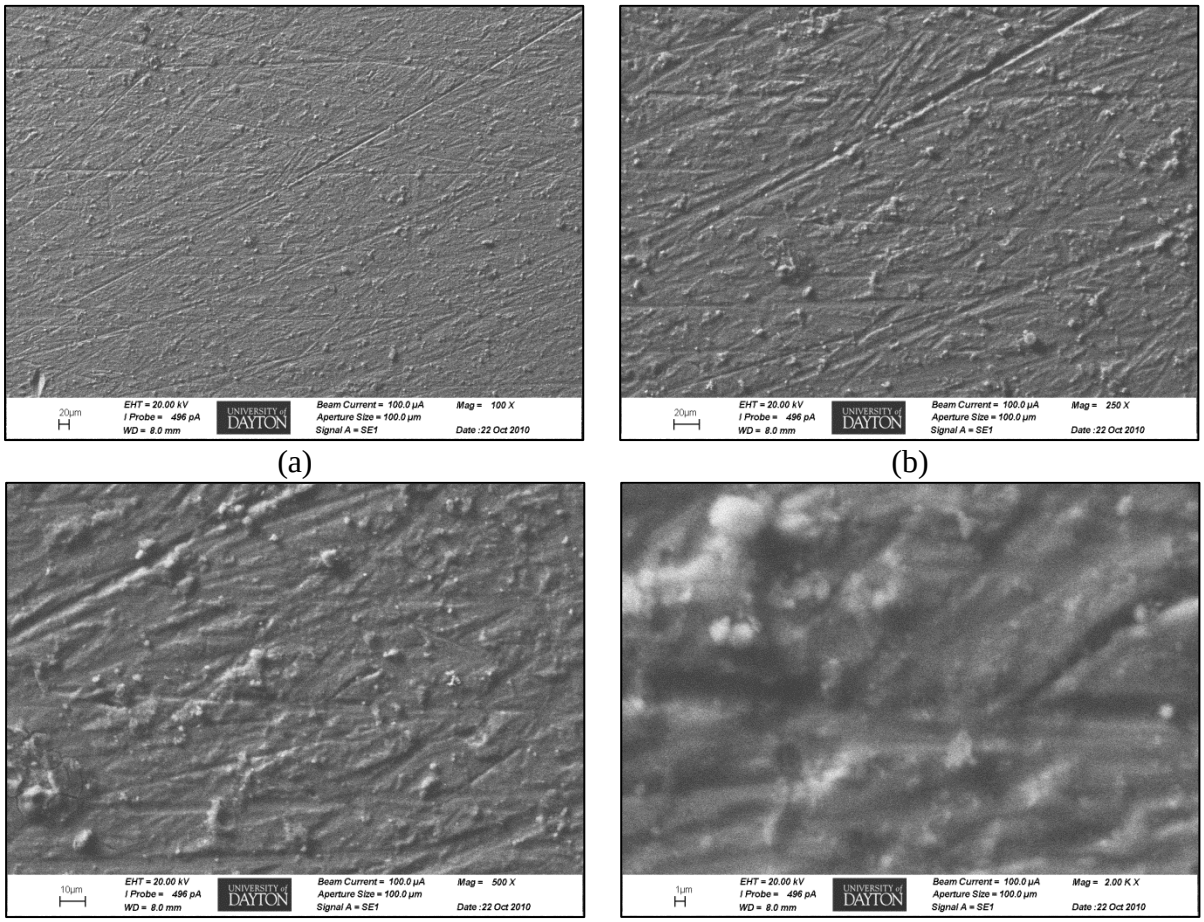


Figure I-28. SEM images of aluminum alloy 2024 sample retrieved on 12 months exposure from Kirtland AFB site. (a) 100X magnification (b) 250X magnification, (c) 500X magnification, and (d) 2000X magnification.

Distribution Statement A. Approved for Public Release.

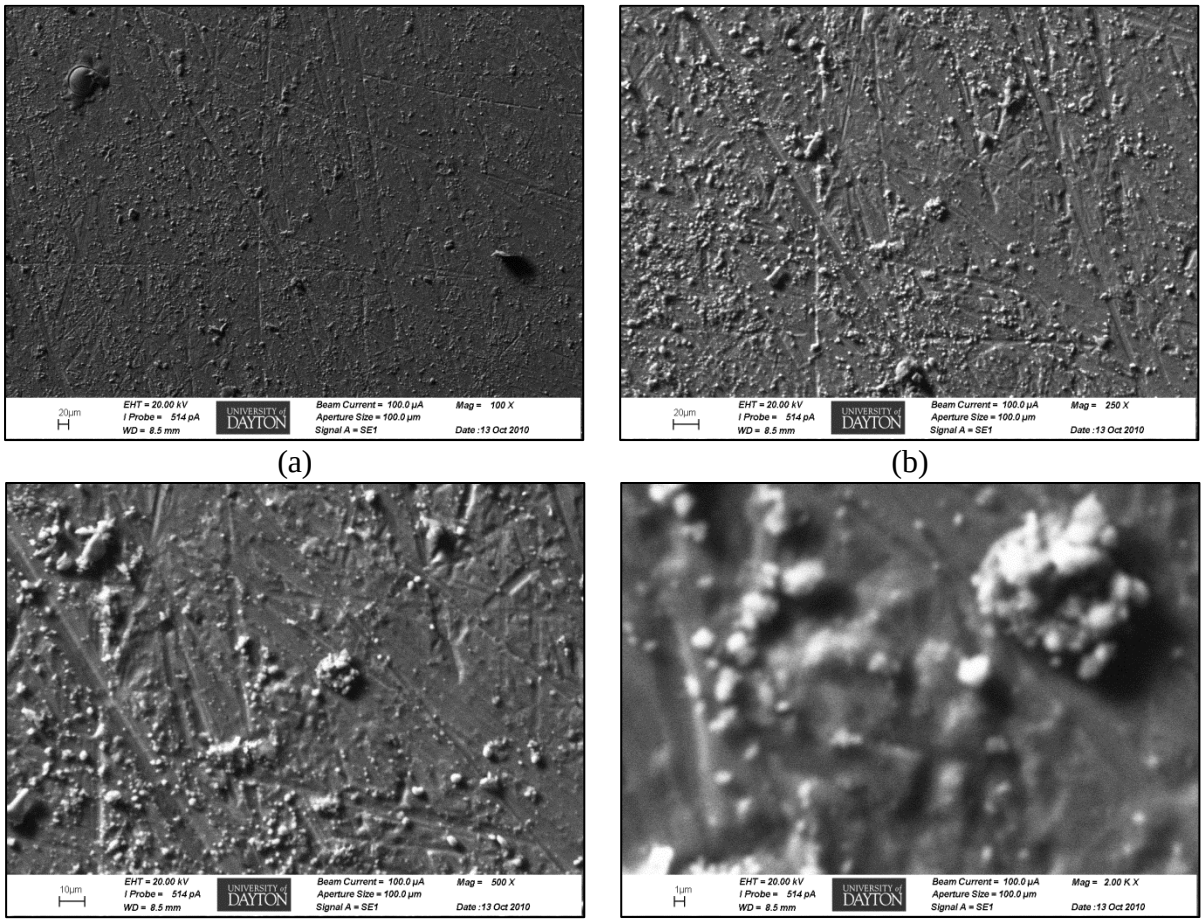


Figure I-29. SEM images of aluminum alloy 2024 sample retrieved on 9 months exposure from Kirtland AFB site. (a) 100X magnification (b) 250X magnification, (c) 500X magnification, and (d) 2000X magnification.

Distribution Statement A. Approved for Public Release.

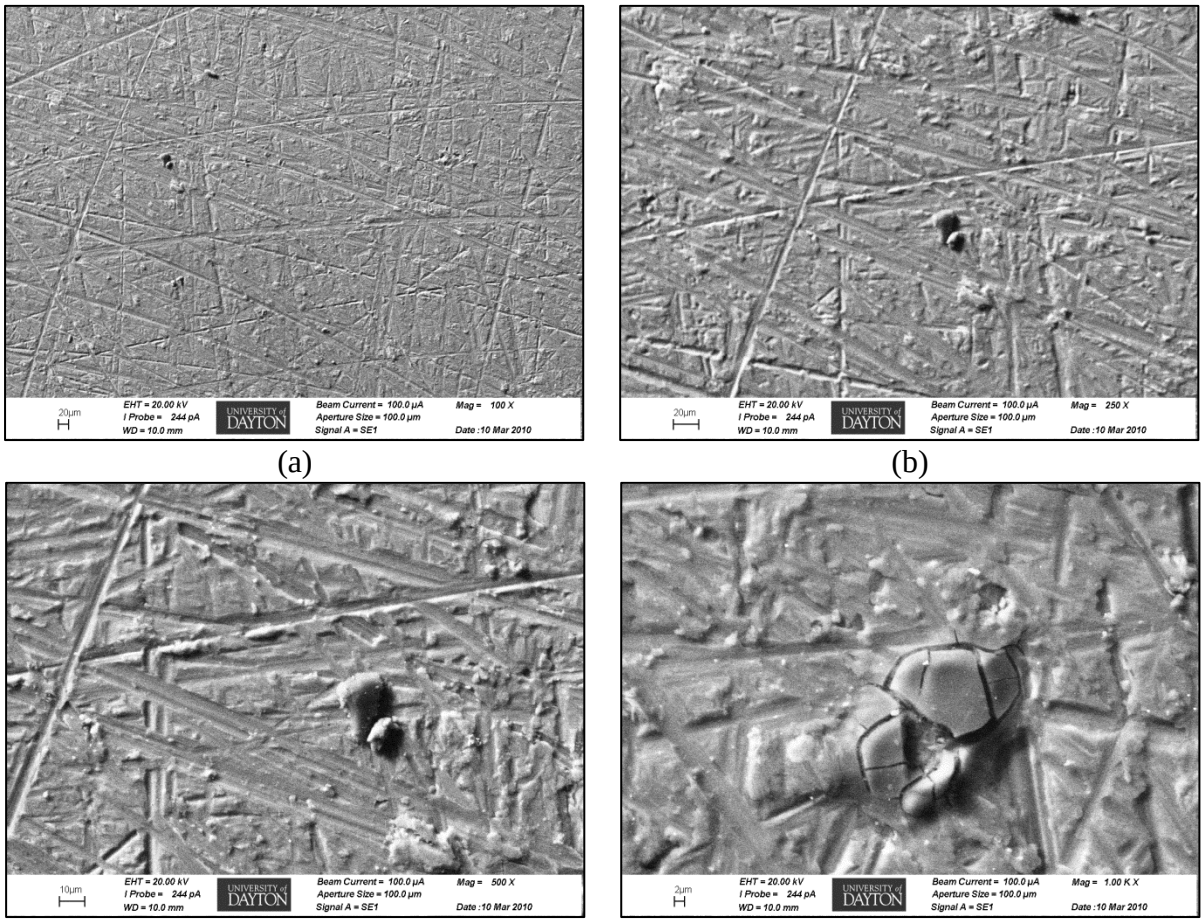


Figure I-30. SEM images of aluminum alloy 2024 sample retrieved on 6 months exposure from Kirtland AFB site. (a) 100X magnification (b) 250X magnification, (c) 500X magnification , and (d) 1000X magnification.

Distribution Statement A. Approved for Public Release.

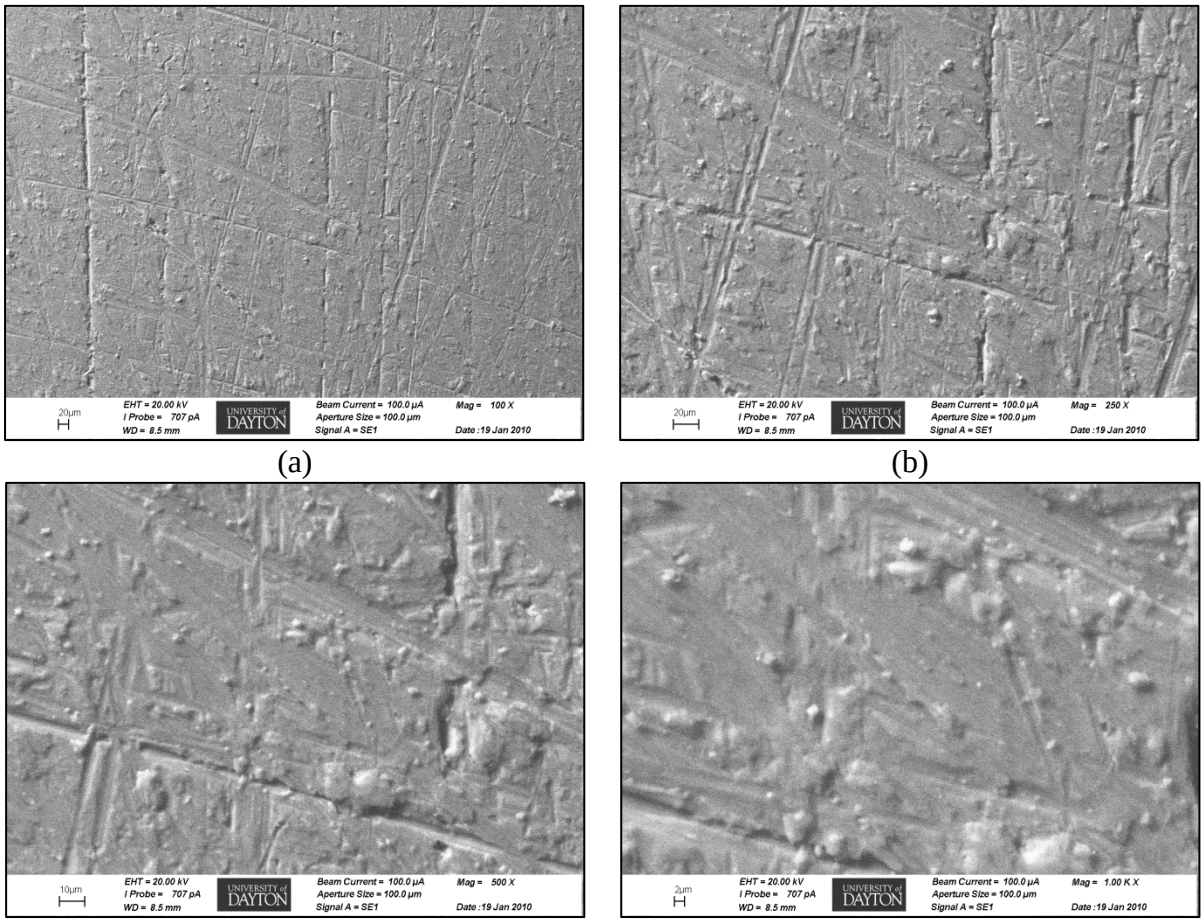


Figure I-31. SEM images of aluminum alloy 2024 sample retrieved on 3 months exposure from Kirtland AFB site. (a) 100X magnification, (b) 250X magnification, (c) 500X magnification, and (d) 1000X magnification.

Distribution Statement A. Approved for Public Release.

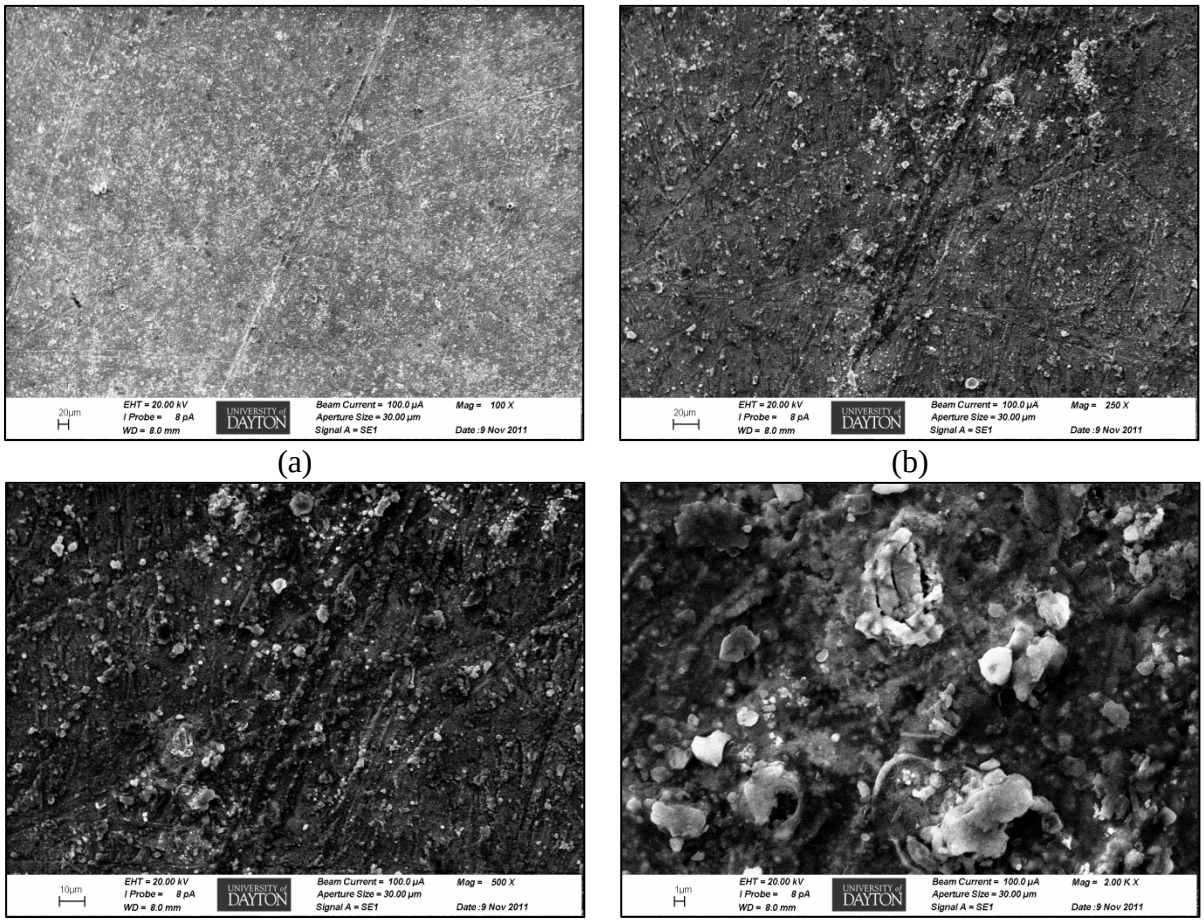


Figure I-32. SEM images of pure copper sample retrieved on 24 months exposure from Kirtland AFB site. (a) 100X magnification (b) 250X magnification, (c) 500X magnification, and (d) 2000X magnification.

Distribution Statement A. Approved for Public Release.

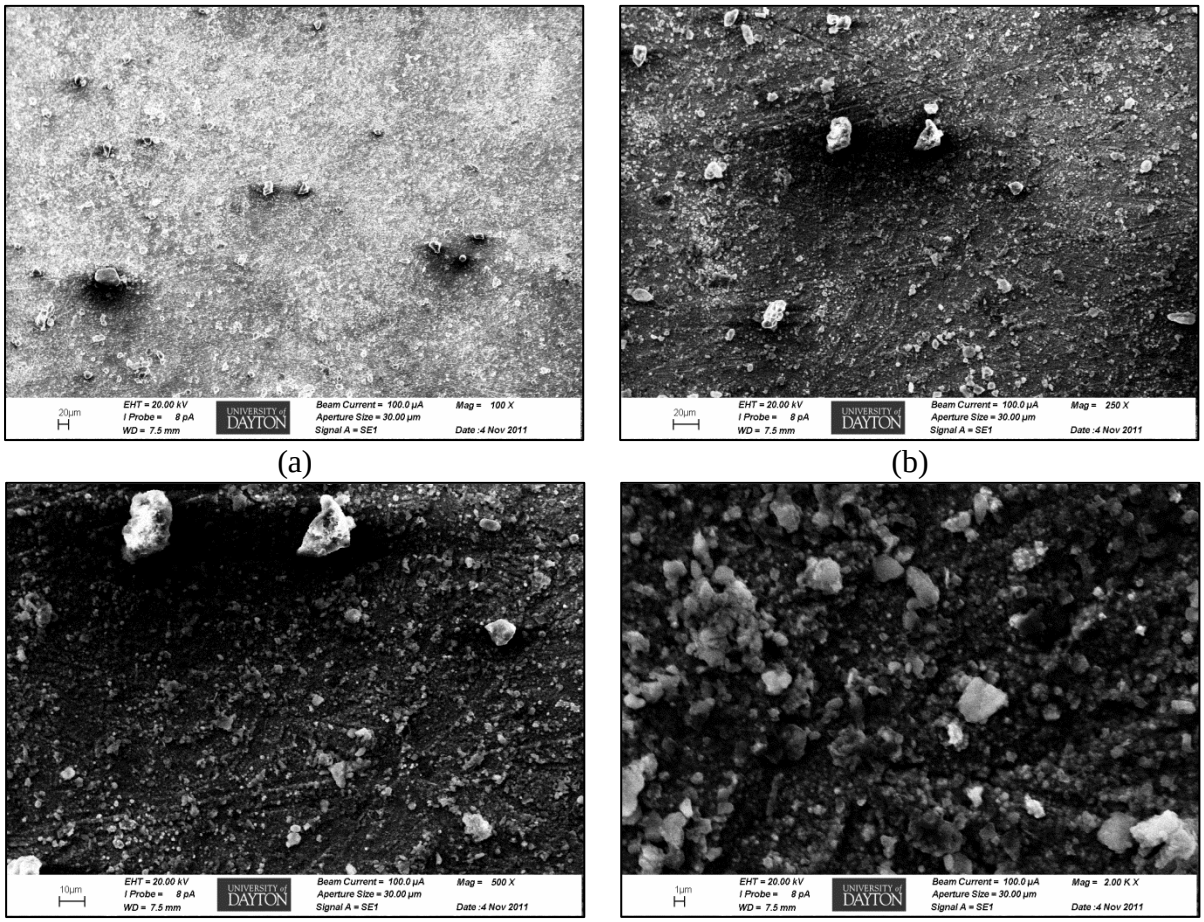


Figure I-33. SEM images of pure copper sample retrieved on 21 months exposure from Kirtland AFB site. (a) 100X magnification (b) 250X magnification, (c) 500X magnification, and (d) 2000X magnification.

Distribution Statement A. Approved for Public Release.

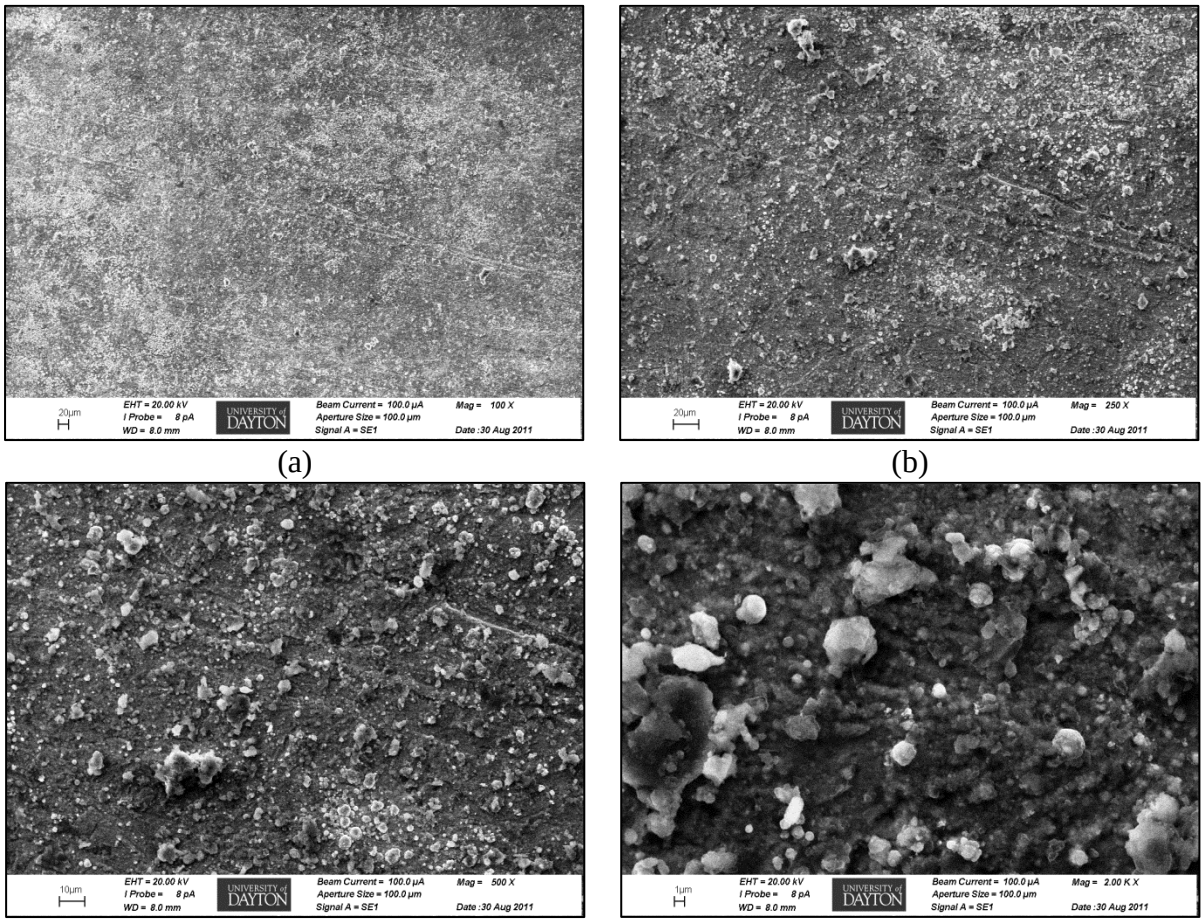


Figure I-34. SEM images of pure copper sample retrieved on 18 months exposure from Kirtland AFB site. (a) 100X magnification (b) 250X magnification, (c) 500X magnification, and (d) 2000X magnification.

Distribution Statement A. Approved for Public Release.

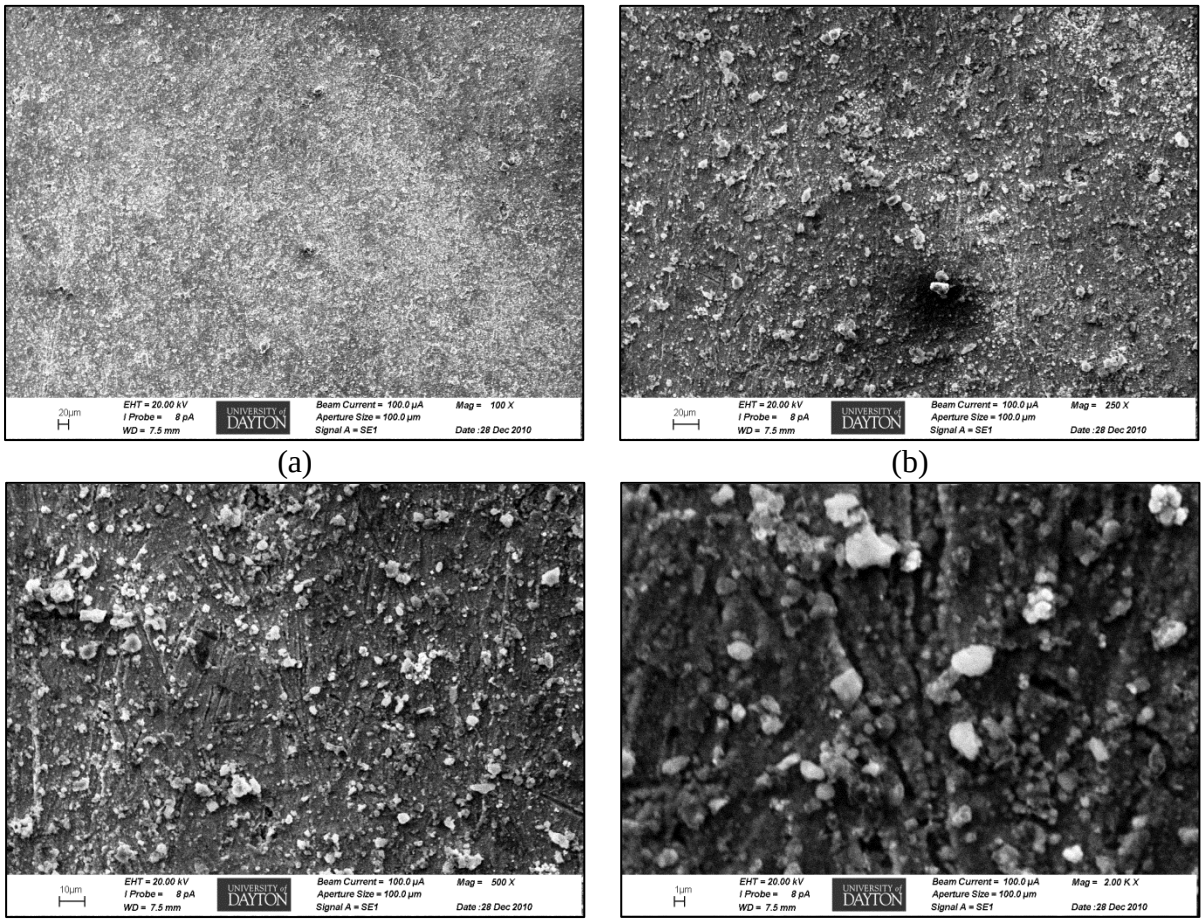


Figure I-35. SEM images of pure copper sample retrieved on 15 months exposure from Kirtland AFB site. (a) 100X magnification (b) 250X magnification, (c) 500X magnification, and (d) 2000X magnification.

Distribution Statement A. Approved for Public Release.

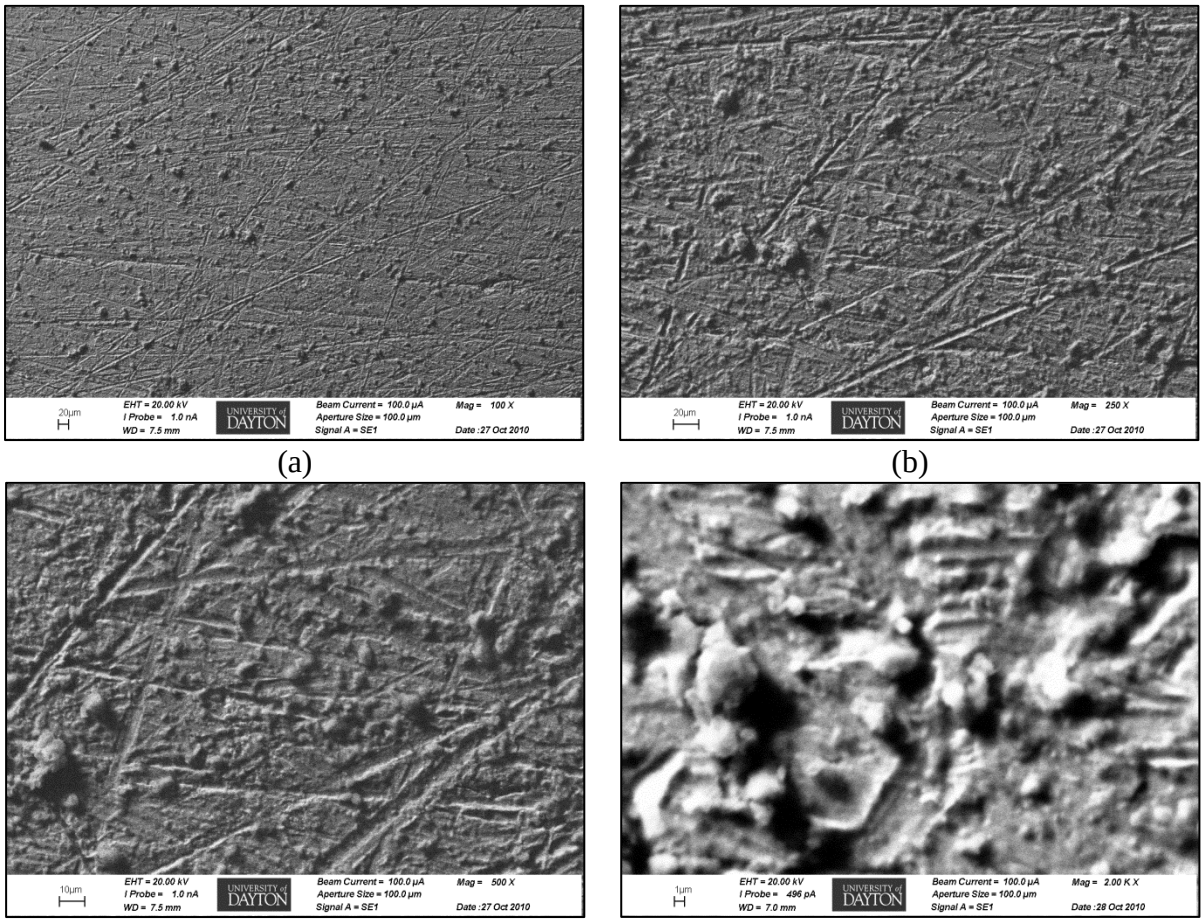


Figure I-36. SEM images of pure copper sample retrieved on 12 months exposure from Kirtland AFB site. (a) 100X magnification (b) 250X magnification, (c) 500X magnification, and (d) 2000X magnification.

Distribution Statement A. Approved for Public Release.

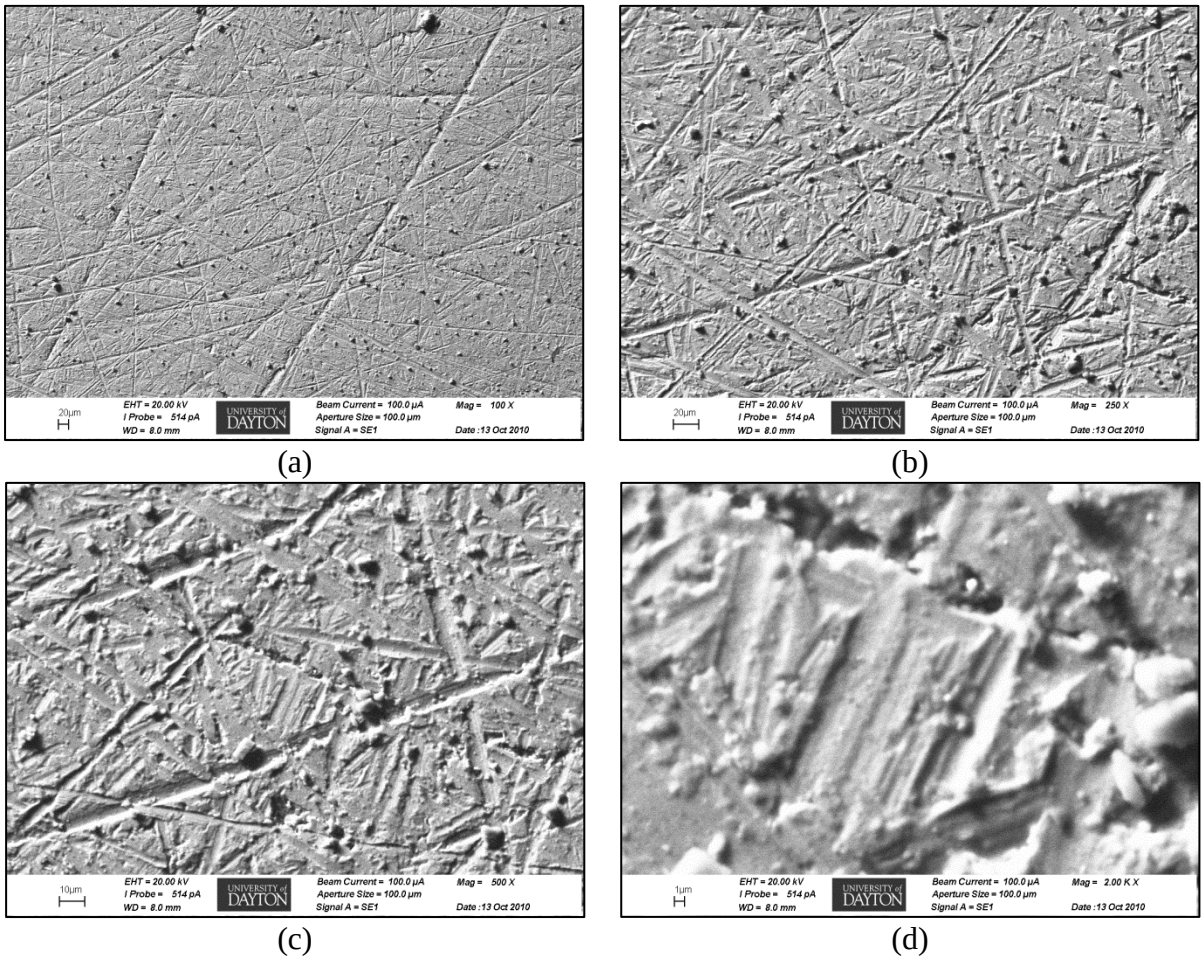


Figure I-37. SEM images of pure copper sample retrieved on 9 months exposure from Kirtland AFB site. (a) 100X magnification (b) 250X magnification, (c) 500X magnification, and (d) 2000X magnification.

Distribution Statement A. Approved for Public Release.

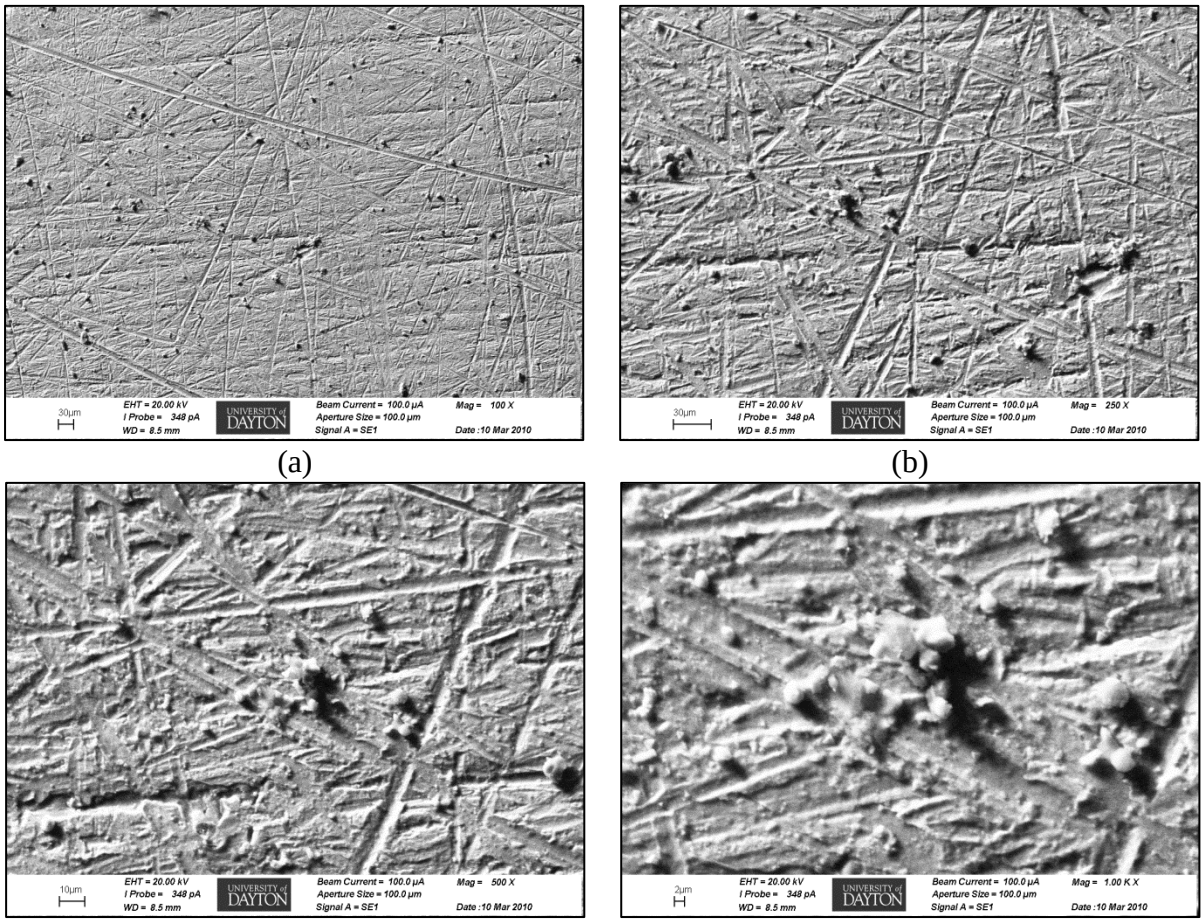
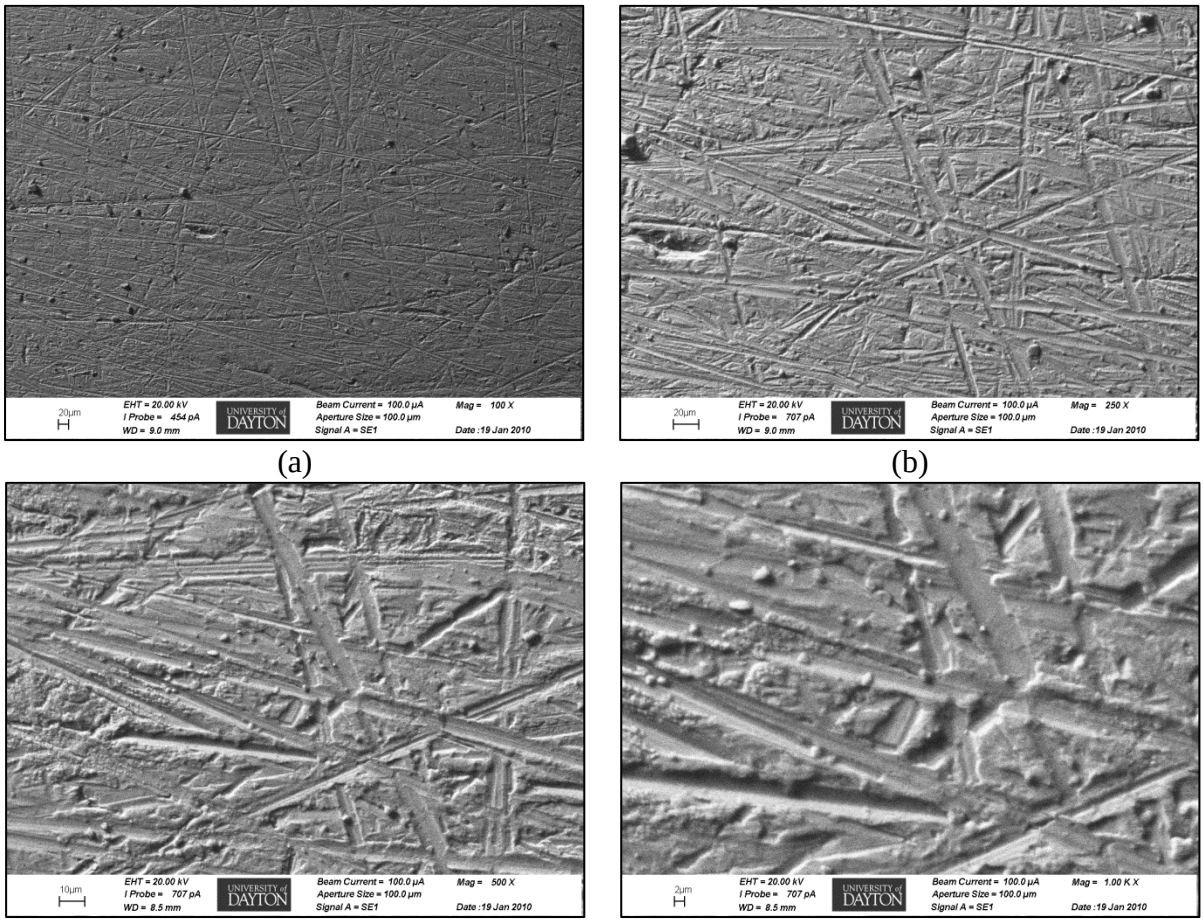


Figure I-38. SEM images of pure copper sample retrieved on 6 months exposure from Kirtland AFB site. (a) 100X magnification (b) 250X magnification, (c) 500X magnification., and (d) 1000X magnification.

Distribution Statement A. Approved for Public Release.



(c)

Figure I-39. SEM images of pure copper sample retrieved on 3 months exposure from Kirtland AFB site. (a) 100X magnification (b) 250X magnification, (c) 500X magnification, and (d) 1000X magnification.

Distribution Statement A. Approved for Public Release.

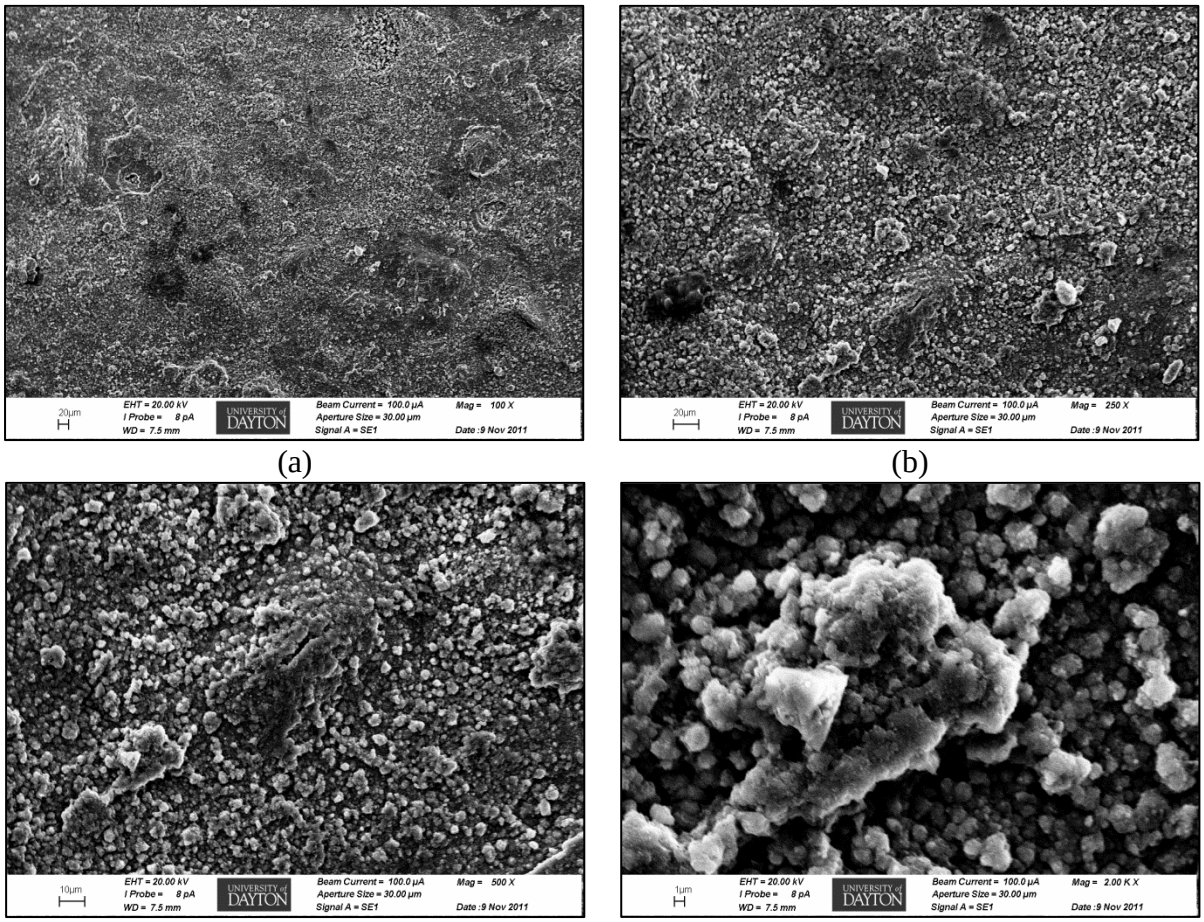


Figure I-40. SEM images of 1010 steel sample retrieved on 24 months exposure from Kirtland AFB site. (a) 100X magnification (b) 250X magnification, (c) 500X magnification, and (d) 2000X magnification.

Distribution Statement A. Approved for Public Release.

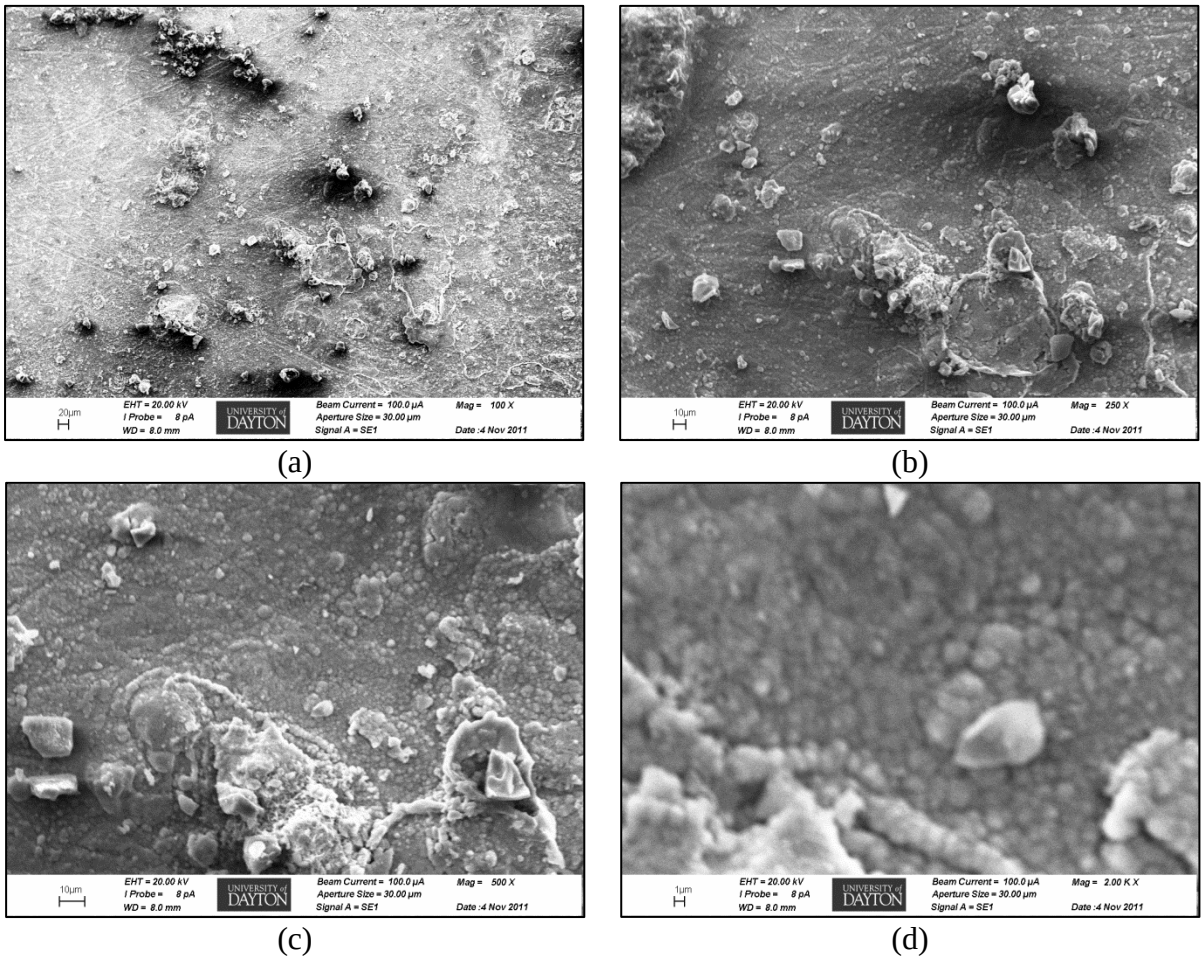


Figure I-41. SEM images of 1010 steel sample retrieved on 21 months exposure from Kirtland AFB site. (a) 100X magnification (b) 250X magnification, (c) 500X magnification, and (d) 2000X magnification.

Distribution Statement A. Approved for Public Release.

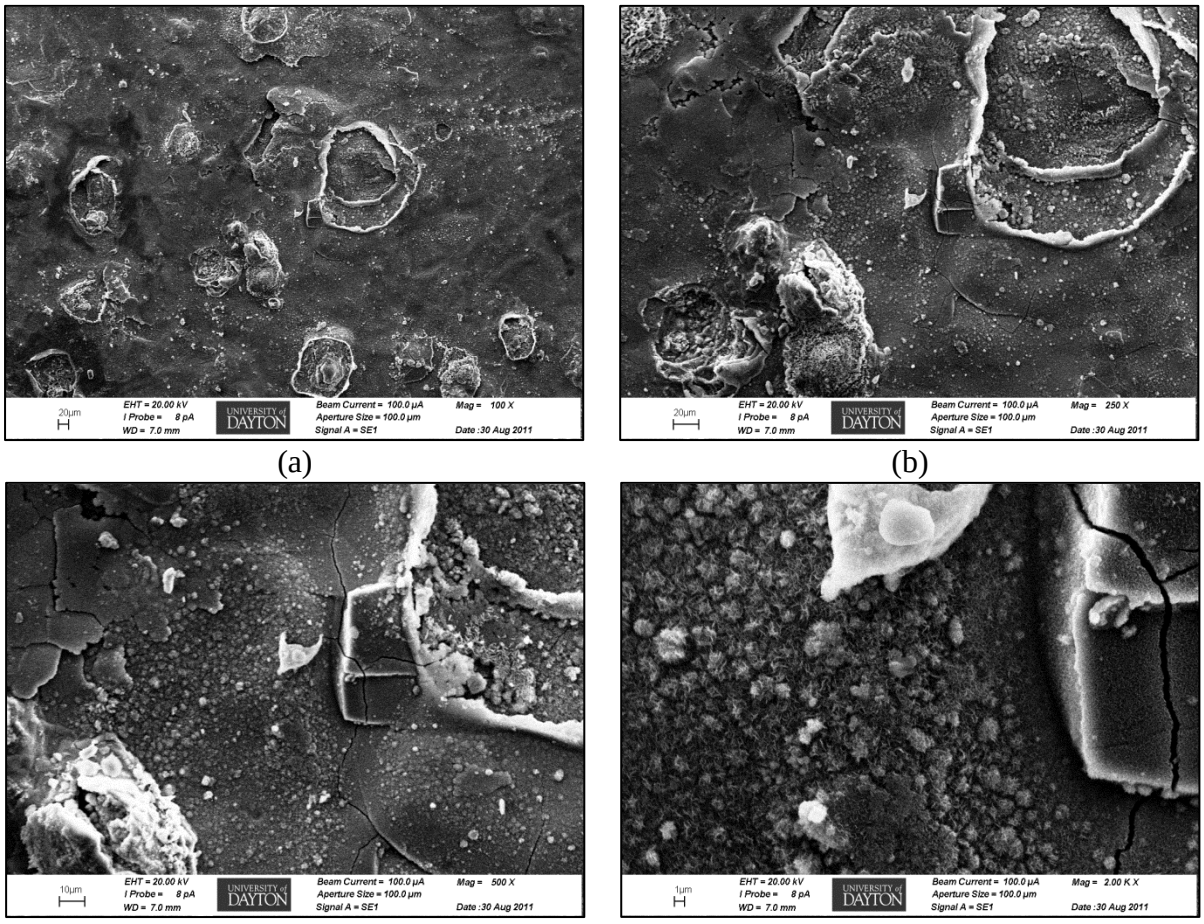


Figure I-42. SEM images of 1010 steel sample retrieved on 18 months exposure from Kirtland AFB site. (a) 100X magnification (b) 250X magnification, (c) 500X magnification, and (d) 2000X magnification.

Distribution Statement A. Approved for Public Release.

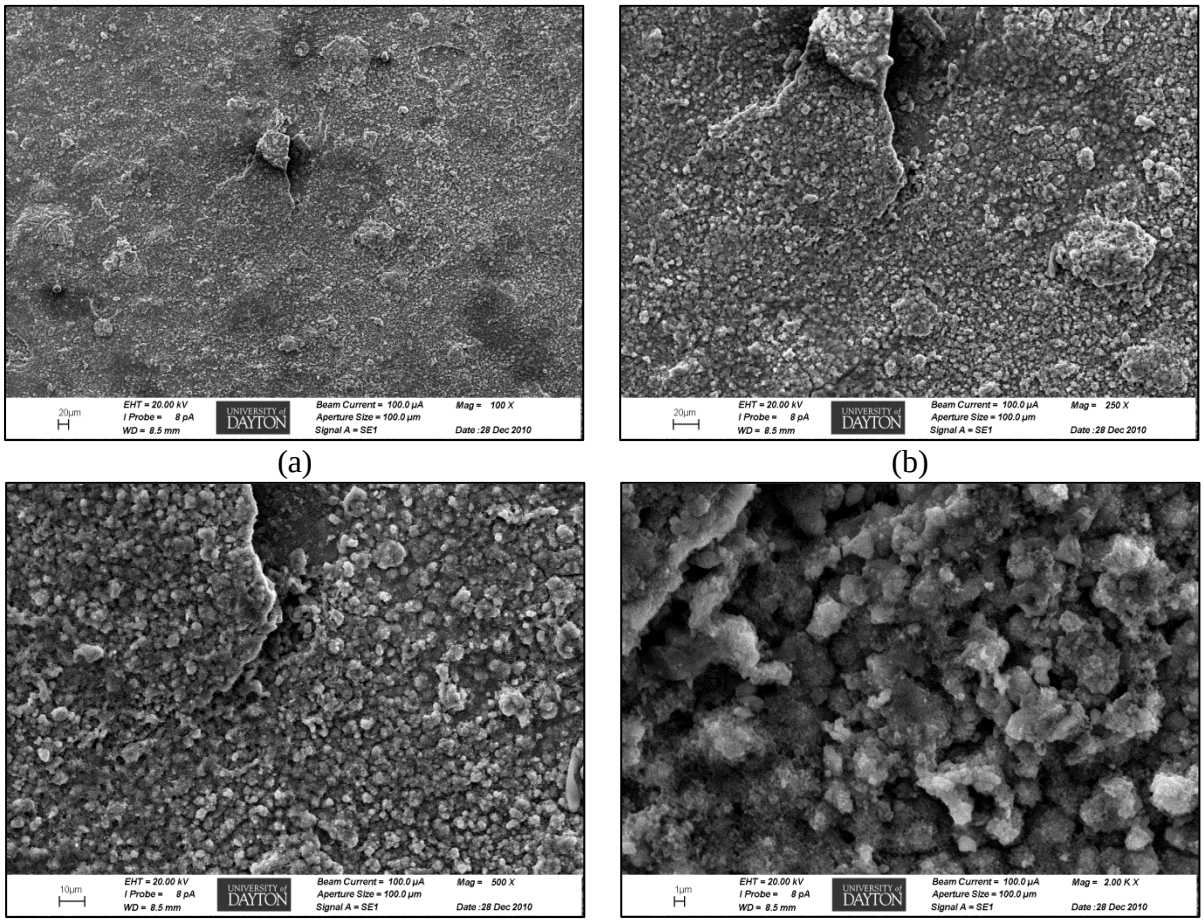


Figure I-43. SEM images of 1010 steel sample retrieved on 15 months exposure from Kirtland AFB site. (a) 100X magnification (b) 250X magnification, (c) 500X magnification, and (d) 2000X magnification.

Distribution Statement A. Approved for Public Release.

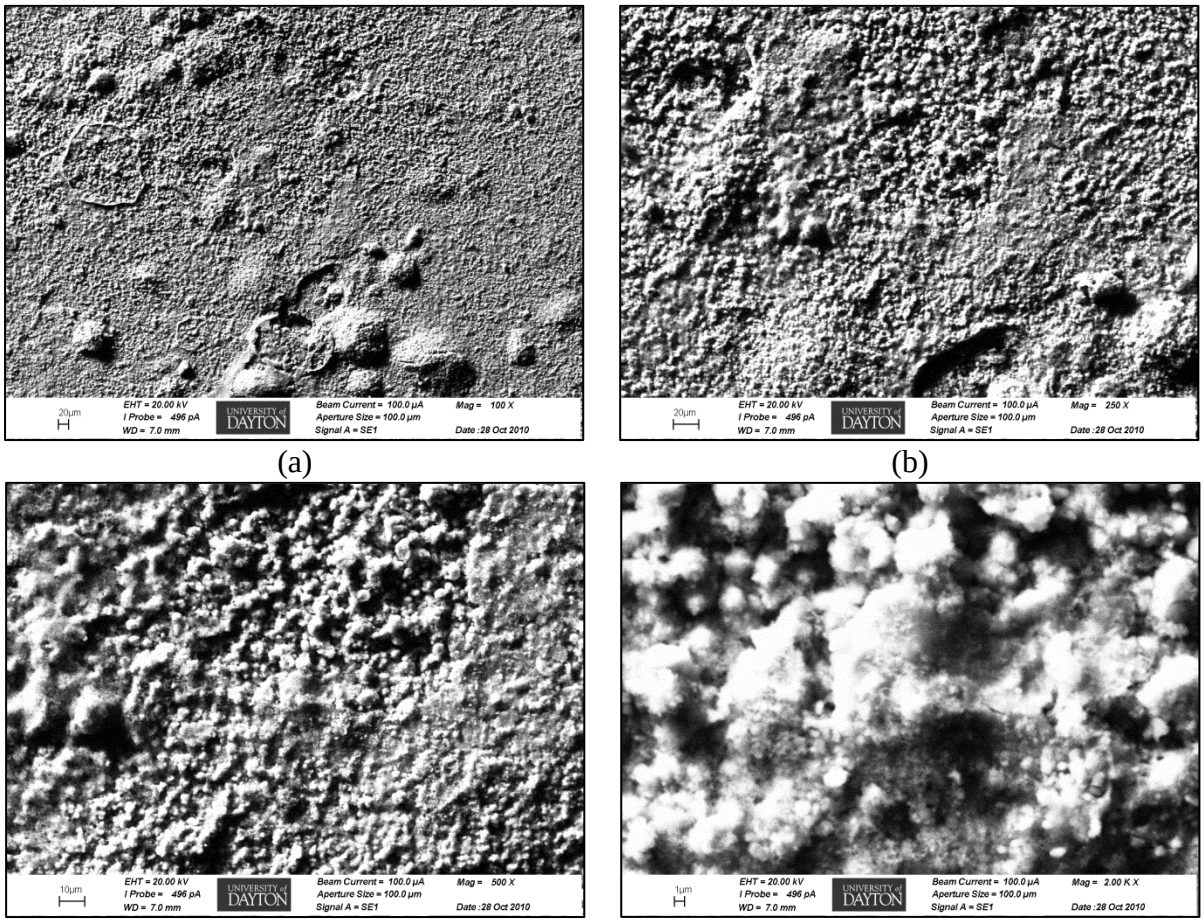


Figure I-44. SEM images of 1010 steel sample retrieved on 12 months exposure from Kirtland AFB site. (a) 100X magnification (b) 250X magnification, (c) 500X magnification, and (d) 2000X magnification.

Distribution Statement A. Approved for Public Release.

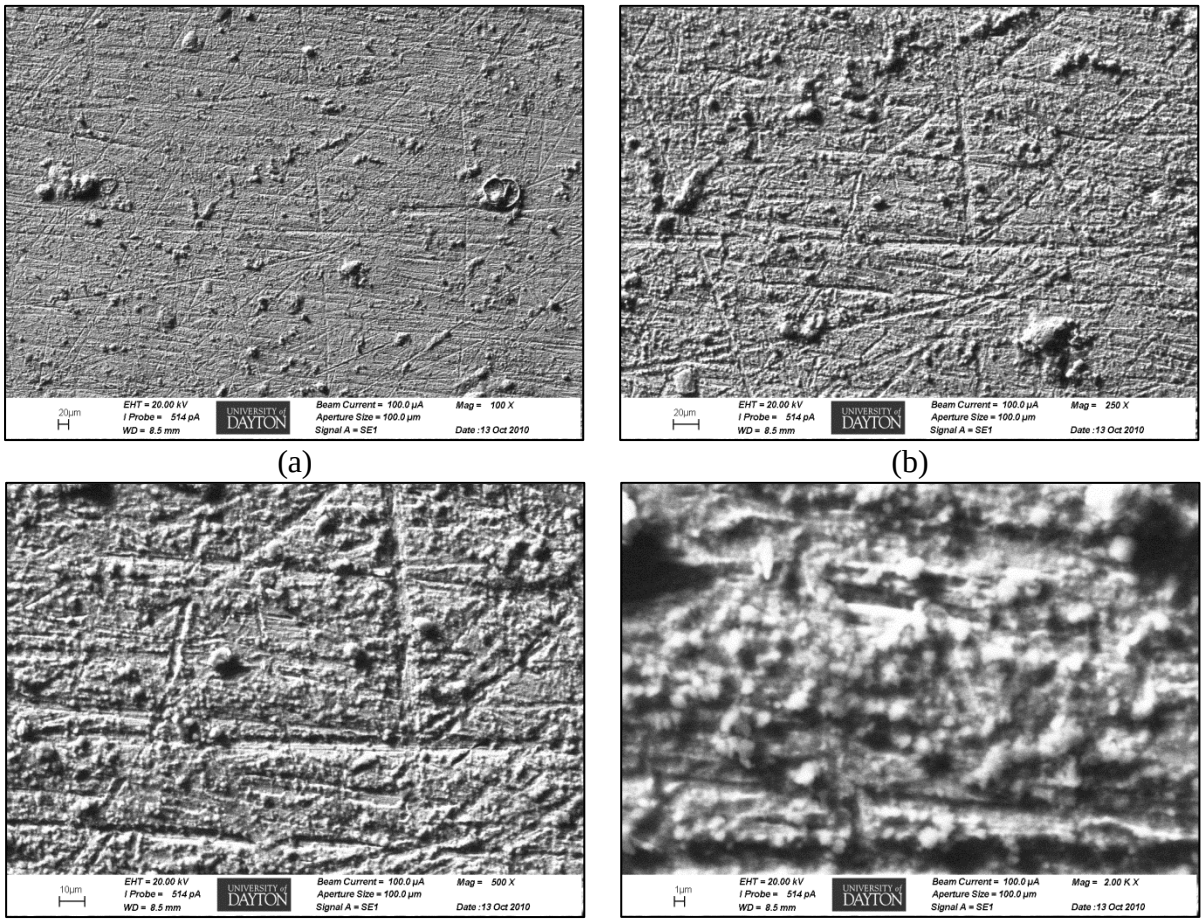


Figure I-45. SEM images of 1010 steel sample retrieved on 9 months exposure from Kirtland AFB site. (a) 100X magnification (b) 250X magnification, (c) 500X magnification, and (d) 2000X magnification.

Distribution Statement A. Approved for Public Release.

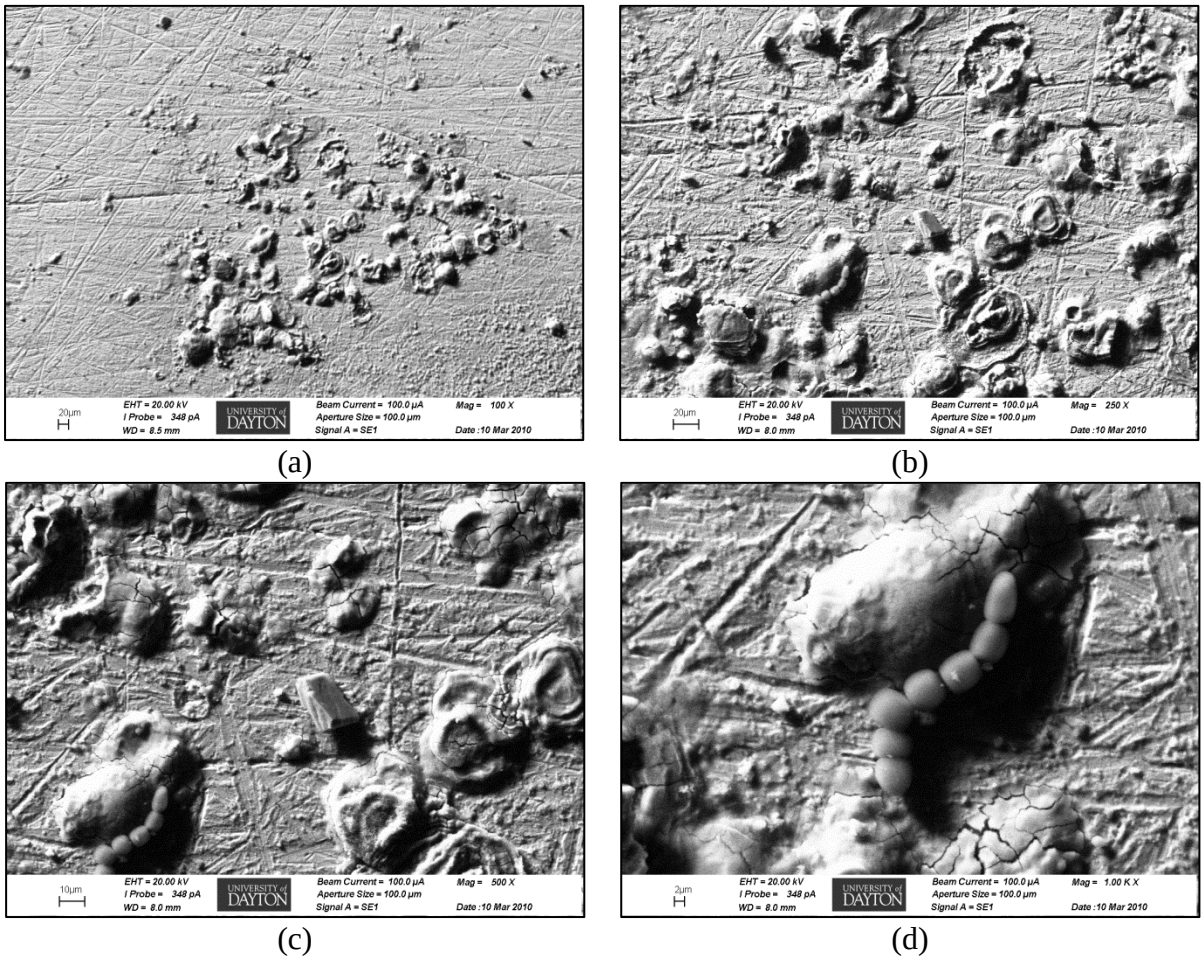


Figure I-46. SEM images of 1010 steel sample retrieved on 6 months exposure from Kirtland AFB site. (a) 100X magnification (b) 250X magnification, (c) 500X magnification, and (d) 1000X magnification.

Distribution Statement A. Approved for Public Release.

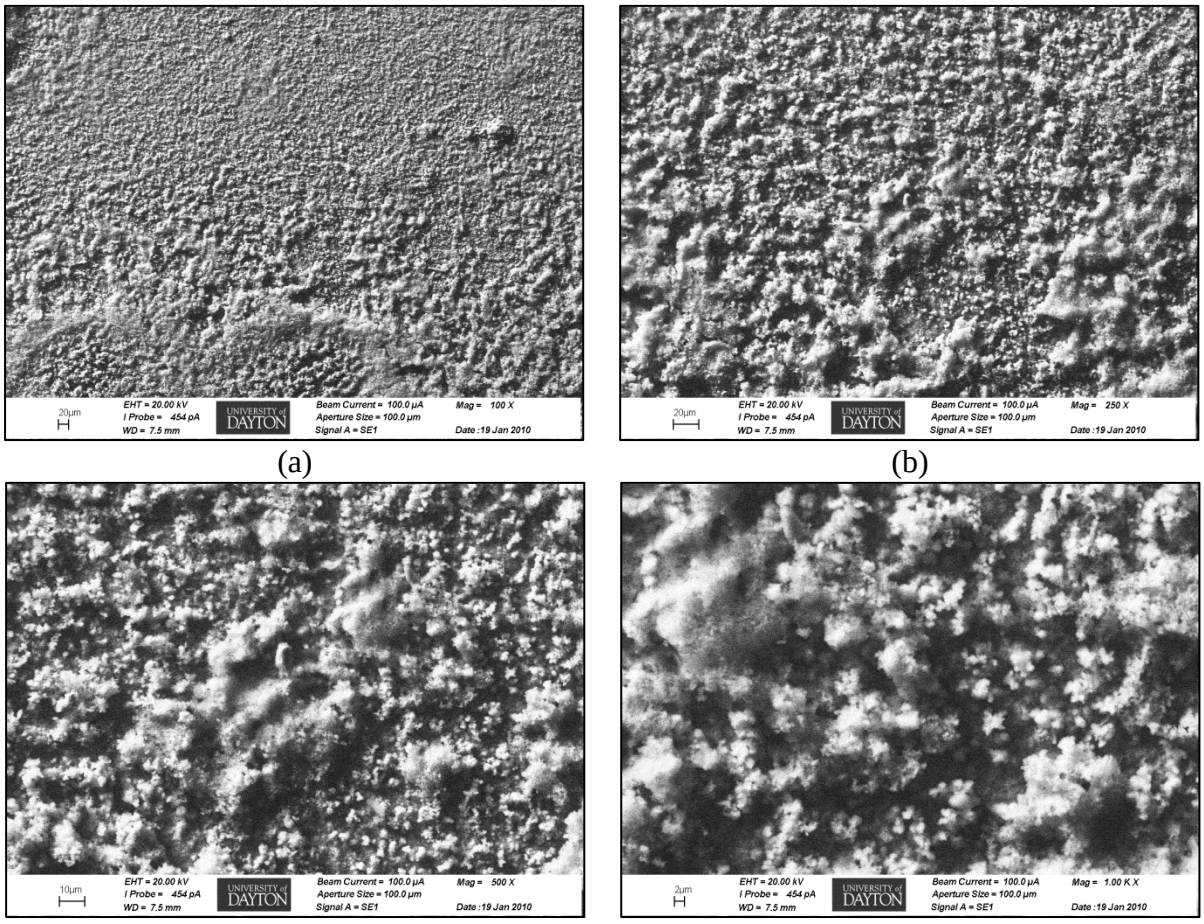


Figure I-47. SEM images of 1010 steel sample retrieved on 3 months exposure from Kirtland AFB site. (a) 100X magnification, (b) 250X magnification, (c) 500X magnification, and (d) 1000X magnification.

Distribution Statement A. Approved for Public Release.

Appendix J

EDS Data for All Outdoor Exposure Sites

Distribution Statement A. Approved for Public Release.

FIGURES

Page

Figure J- 1. EDS of pure silver samples retrieved from Daytona Beach exposure site 5

Figure J- 2. EDS of aluminum alloy 7075 samples retrieved from Daytona Beach exposure site. 6

Figure J- 3. EDS of aluminum alloy 6061 samples retrieved from Daytona Beach exposure site. 7

Figure J- 4. EDS of aluminum alloy 2024 samples retrieved from Daytona Beach exposure site.. 8

Figure J- 5. EDS of pure copper samples retrieved from Daytona Beach exposure site.. 9

Figure J- 6. EDS of 1010 steel samples retrieved from Daytona Beach exposure site. 10

Figure J- 7. EDS of pure silver samples retrieved from Pt. Judith exposure site. 11

Figure J- 8. EDS of aluminum alloy 7075 samples retrieved from Pt. Judith exposure site. 12

Figure J- 9. EDS of aluminum alloy 6061 samples retrieved from Pt. Judith exposure site. 13

Figure J- 10. EDS of aluminum alloy 2024 samples retrieved from Pt. Judith exposure site. 14

Figure J- 11. EDS of pure copper samples retrieved from Pt. Judith exposure site. 15

Figure J- 12. EDS of 1010 steel samples retrieved from Pt. Judith exposure site. 16

Figure J- 13. EDS of pure silver samples retrieved from East Coast Ship exposure site. 17

Figure J- 14. EDS of aluminum alloy 7075 samples retrieved from East Coast Ship exposure site. 18

Figure J- 15. EDS of aluminum alloy 6061 samples retrieved from East Coast Ship exposure site. 19

Figure J- 16. EDS of aluminum alloy 2024 samples retrieved from East Coast Ship exposure site. 20

Figure J- 17. EDS of pure copper samples retrieved from East Coast Ship exposure site. 21

Figure J- 18. EDS of 1010 steel samples retrieved from Pt. Judith exposure site. 22

Distribution Statement A. Approved for Public Release.

Figure J- 19. EDS of pure silver samples retrieved from West Coast Ship exposure site. 23

Figure J- 20. EDS of aluminum alloy 7075 samples retrieved from West Coast Ship exposure site. 24

Figure J- 21. EDS of aluminum alloy 6061 samples retrieved from West Coast Ship exposure site. 25

Figure J- 22. EDS of aluminum alloy 2024 samples retrieved from West Coast Ship exposure site. 26

Figure J- 23. EDS of pure copper samples retrieved from West Coast Ship exposure site. 27

Figure J- 24. EDS of 1010 steel samples retrieved from West Coast Ship exposure site. 28

Figure J- 25. EDS of pure silver samples retrieved from Kirtland AFB exposure site. 29

Figure J- 26. EDS of aluminum alloy 7075 samples retrieved from Kirtland AFB exposure site. 30

Figure J- 27. EDS of aluminum alloy 6061 samples retrieved from Kirtland AFB exposure site. 31

Figure J- 28. EDS of aluminum alloy 2024 samples retrieved from Kirtland AFB exposure site. 32

Figure J- 29. EDS of pure copper samples retrieved from Kirtland AFB exposure site. 33

Figure J- 30. EDS of 1010 steel samples retrieved from Kirtland AFB exposure site. 34

Figure J- 31. EDS of pure silver samples retrieved from Hickam AFB exposure site. 35

Figure J- 32. EDS of aluminum alloy 7075 samples retrieved from Hickam AFB exposure site. 37

Figure J- 33. EDS of aluminum alloy 6061 samples retrieved from Hickam AFB exposure site. 37

Figure J- 34. EDS of aluminum alloy 2024 samples retrieved from Hickam AFB exposure site. 38

Figure J- 35. EDS of pure copper samples retrieved from Hickam AFB exposure site. 39

Figure J- 36. EDS of 1010 steel samples retrieved from Hickam AFB exposure site. 40

Figure J- 37. EDS of pure silver samples retrieved from Tyndall AFB exposure site. 41

Figure J- 38. EDS of aluminum alloy 7075 samples retrieved from Tyndall AFB exposure site. 42

Distribution Statement A. Approved for Public Release.

Figure J- 39. EDS of aluminum alloy 6061 samples retrieved from Tyndall AFB exposure site. 43

Figure J- 40. EDS of aluminum alloy 2024 samples retrieved from Tyndall AFB exposure site. 44

Figure J- 41. EDS of pure copper samples retrieved from Tyndall AFB exposure site. 45

Figure J- 42. EDS of 1010 steel samples retrieved from Tyndall AFB exposure site. 46

Figure J- 43. EDS of pure silver samples retrieved from Wright-Patterson AFB exposure site. 47

Figure J- 44. EDS of aluminum alloy 7075 samples retrieved from Wright-Patterson AFB exposure site. 48

Figure J- 45. EDS of aluminum alloy 6061 samples retrieved from Wright-Patterson AFB exposure site. 49

Figure J- 46. EDS of aluminum alloy 2024 samples retrieved from Wright-Patterson AFB exposure site. 50

Figure J- 47. EDS of pure copper samples retrieved from Wright-Patterson AFB exposure site. 51

Figure J- 48. EDS of 1010 steel samples retrieved from Wright-Patterson AFB exposure site. 52

Distribution Statement A. Approved for Public Release.

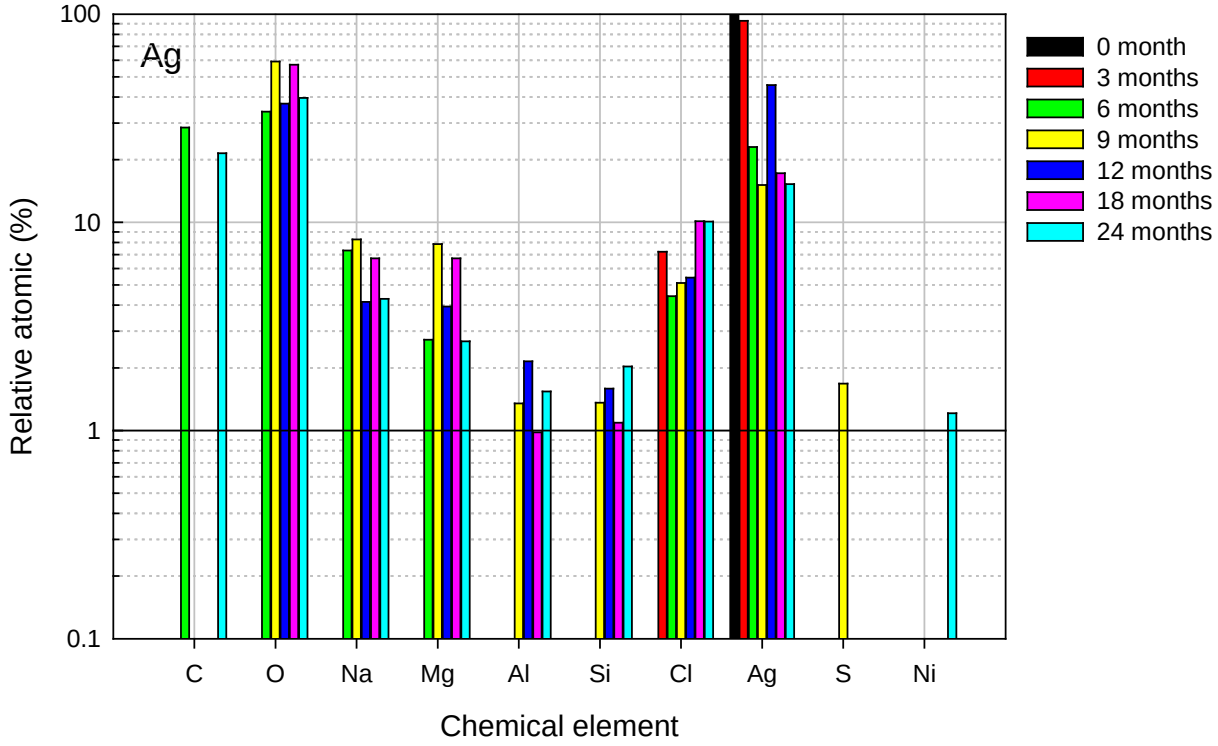


Figure J- 1. EDS of pure silver samples retrieved from Daytona Beach exposure site

Distribution Statement A. Approved for Public Release.

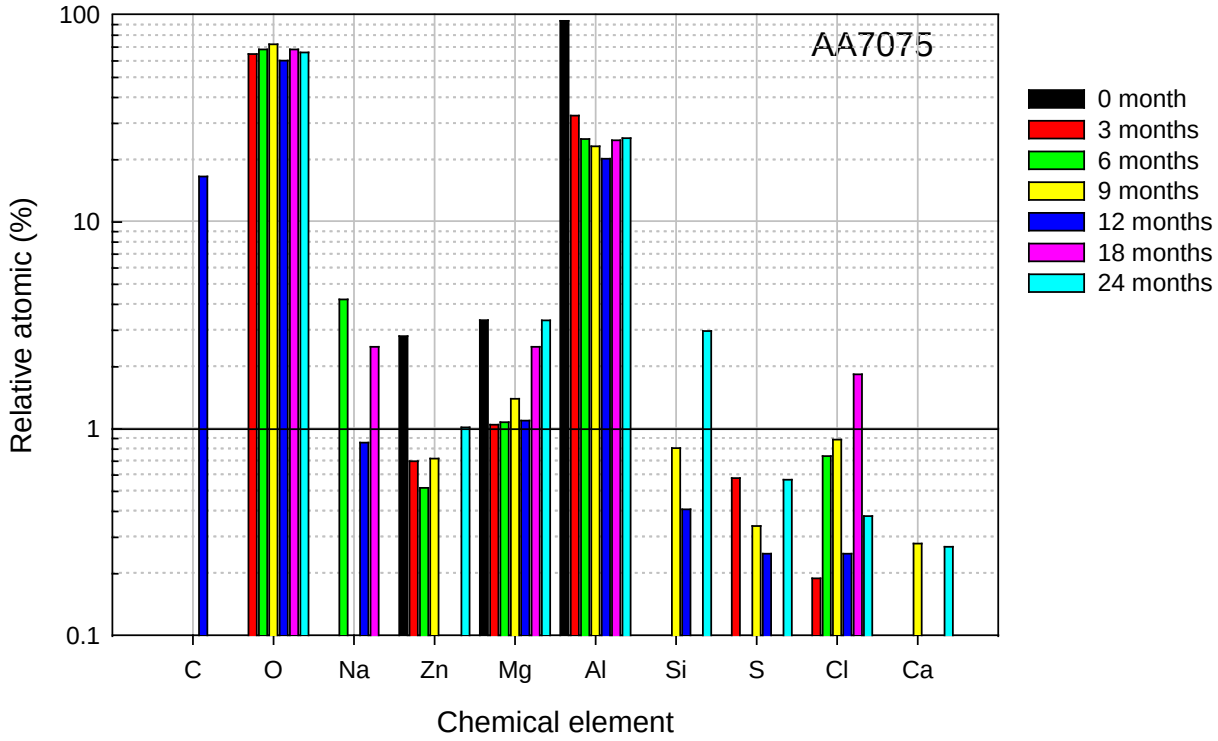


Figure J- 2. EDS of aluminum alloy 7075 samples retrieved from Daytona Beach exposure site.

Distribution Statement A. Approved for Public Release.

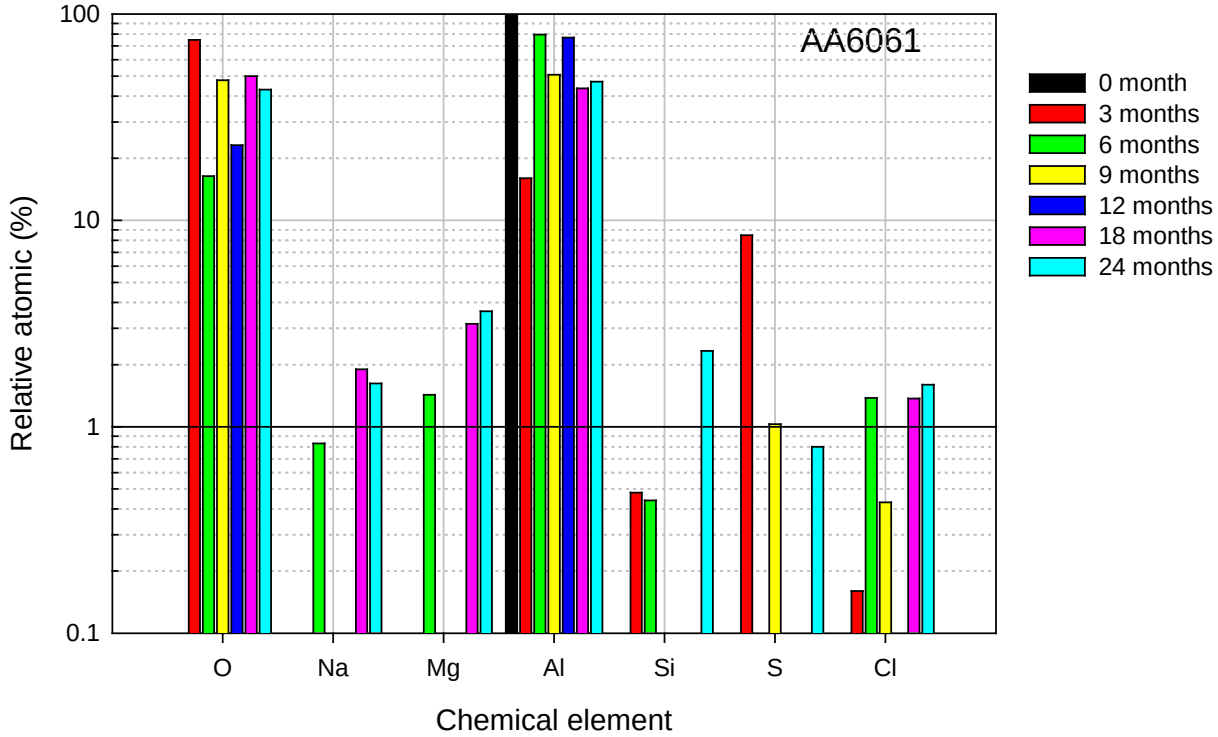


Figure J- 3. EDS of aluminum alloy 6061 samples retrieved from Daytona Beach exposure site.

Distribution Statement A. Approved for Public Release.

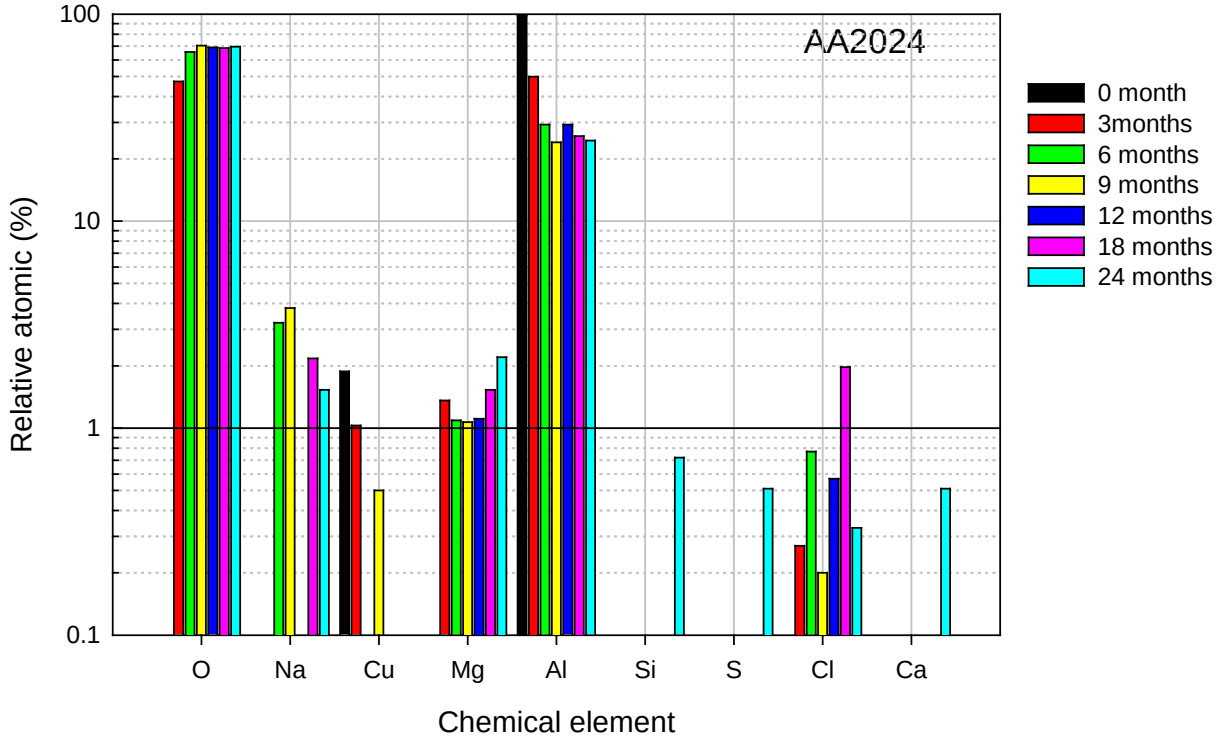


Figure J- 4. EDS of aluminum alloy 2024 samples retrieved from Daytona Beach exposure site..

Distribution Statement A. Approved for Public Release.

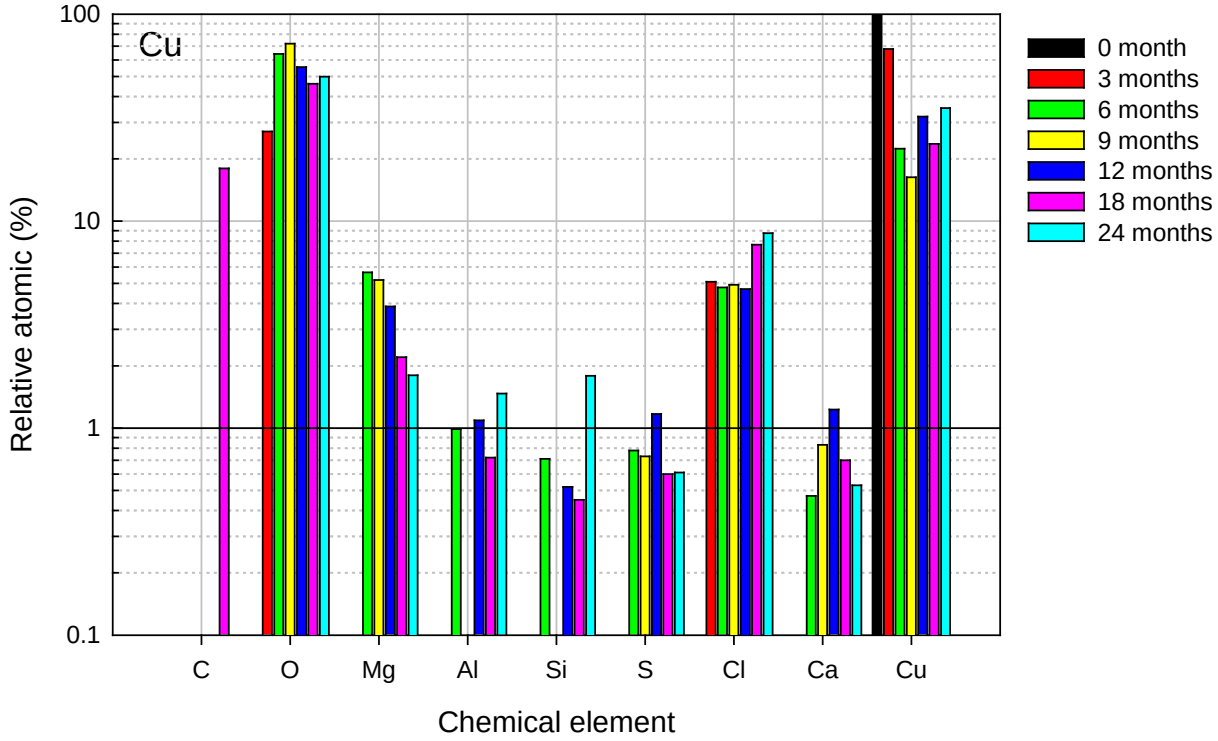


Figure J- 5. EDS of pure copper samples retrieved from Daytona Beach exposure site..

Distribution Statement A. Approved for Public Release.

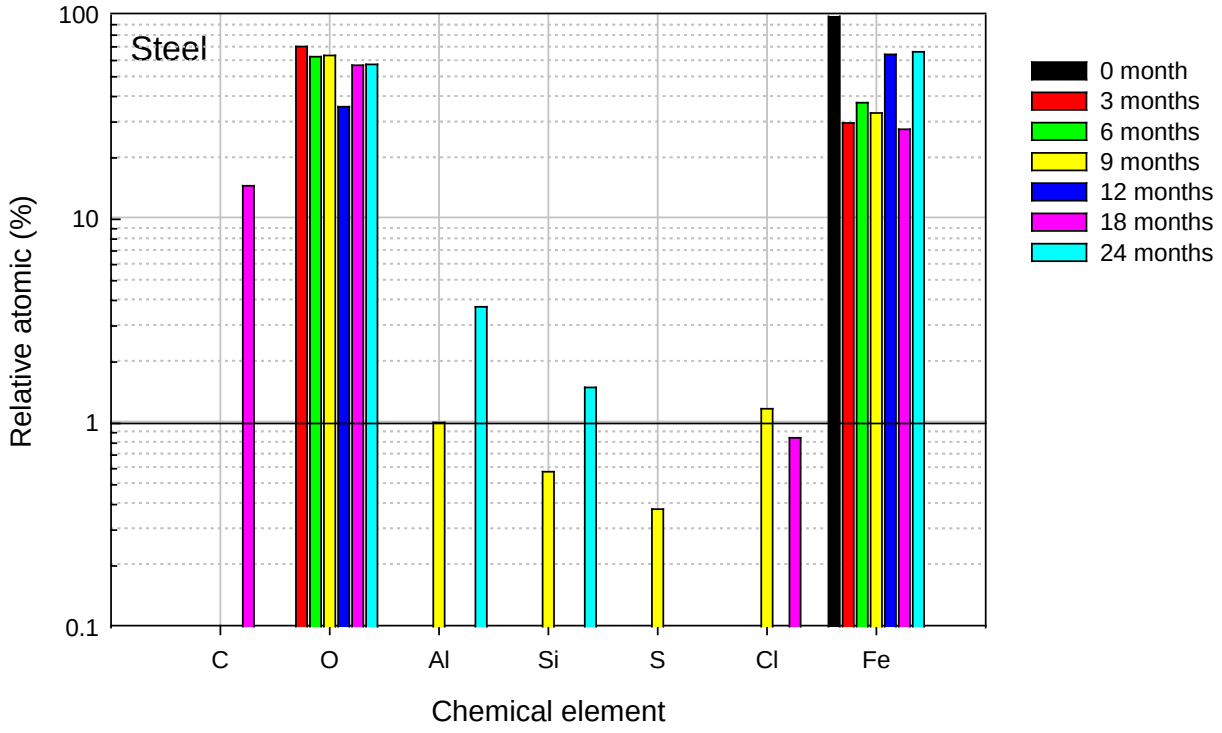


Figure J- 6. EDS of 1010 steel samples retrieved from Daytona Beach exposure site.

Distribution Statement A. Approved for Public Release.

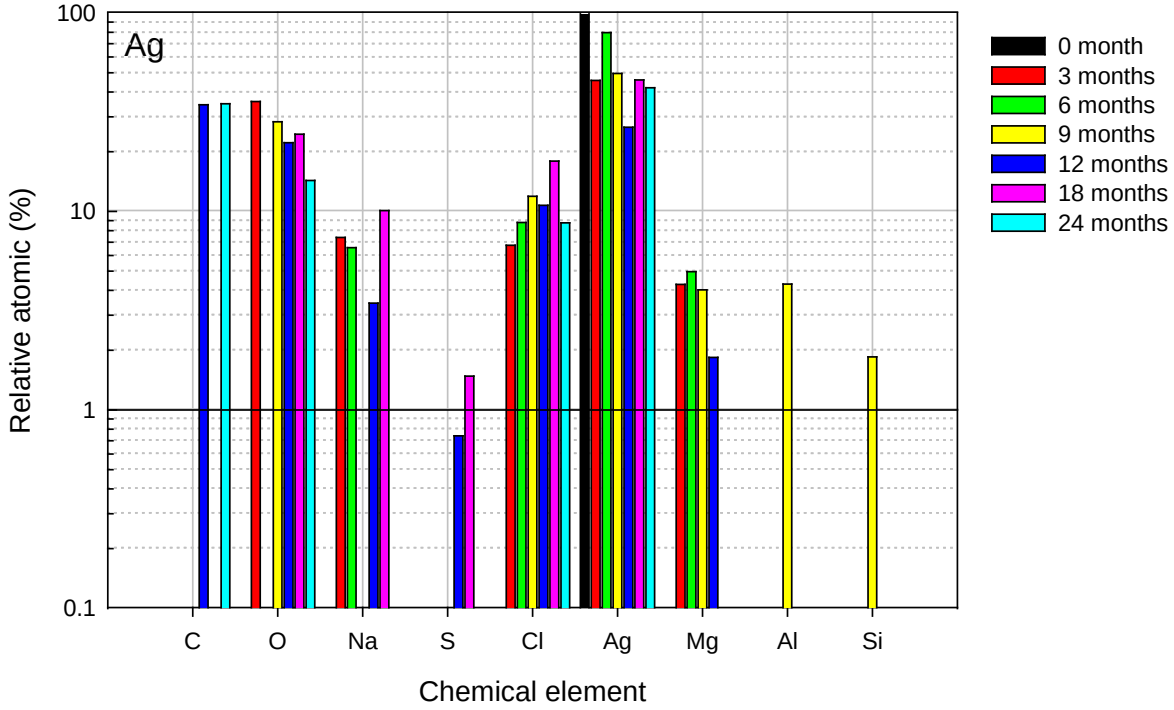


Figure J- 7. EDS of pure silver samples retrieved from Pt. Judith exposure site.

Distribution Statement A. Approved for Public Release.

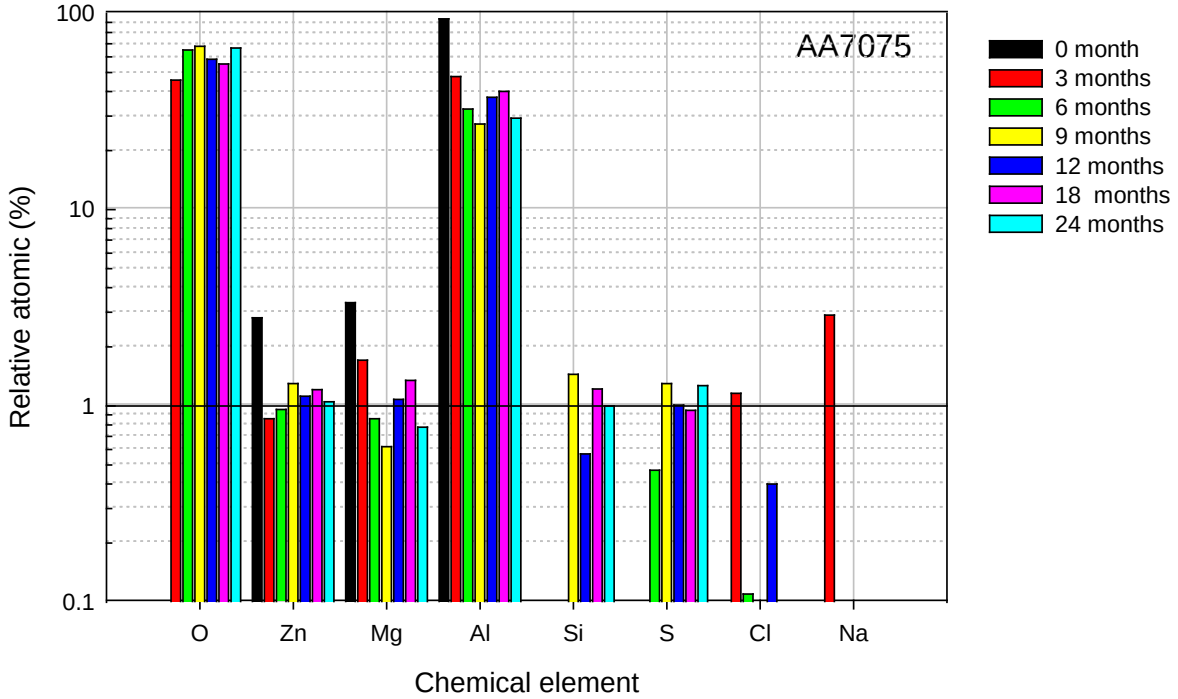


Figure J- 8. EDS of aluminum alloy 7075 samples retrieved from Pt. Judith exposure site.

Distribution Statement A. Approved for Public Release.

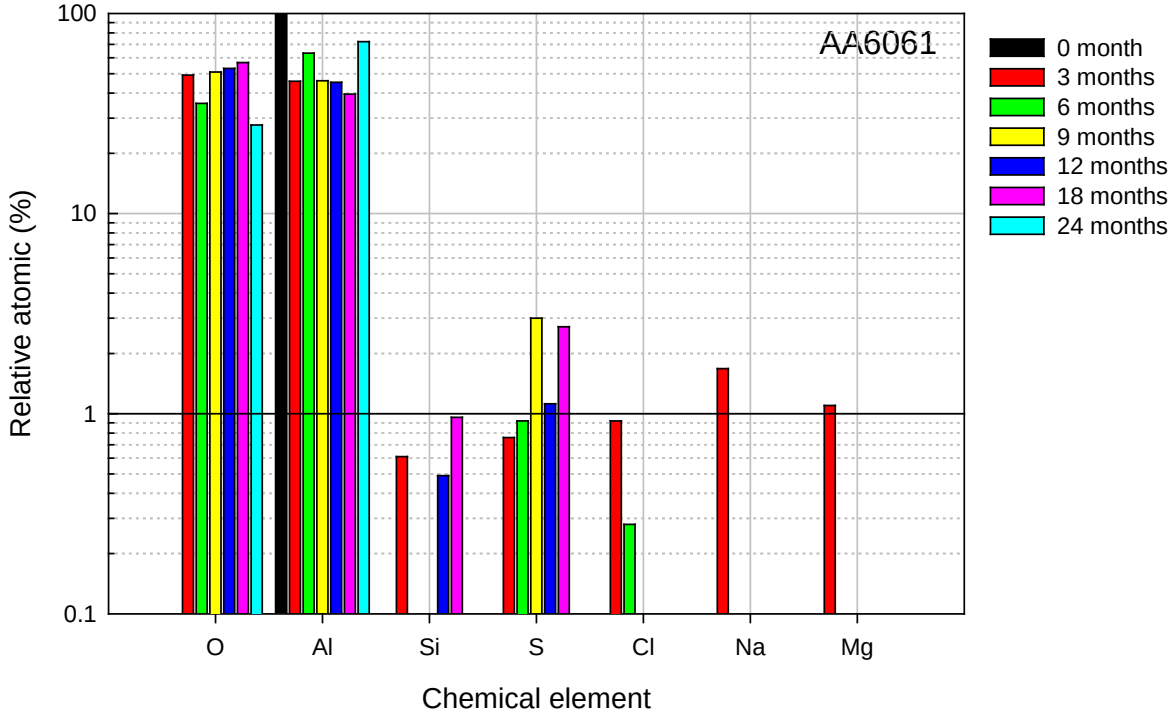


Figure J- 9. EDS of aluminum alloy 6061 samples retrieved from Pt. Judith exposure site.

Distribution Statement A. Approved for Public Release.

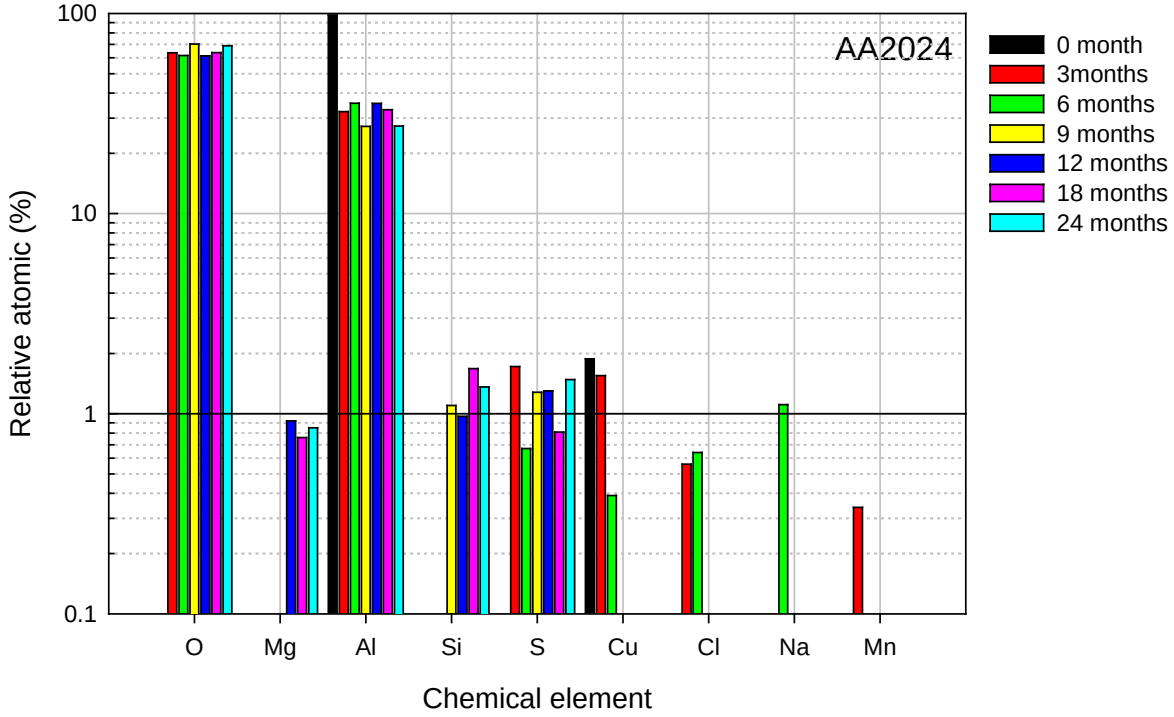


Figure J- 10. EDS of aluminum alloy 2024 samples retrieved from Pt. Judith exposure site.

Distribution Statement A. Approved for Public Release.

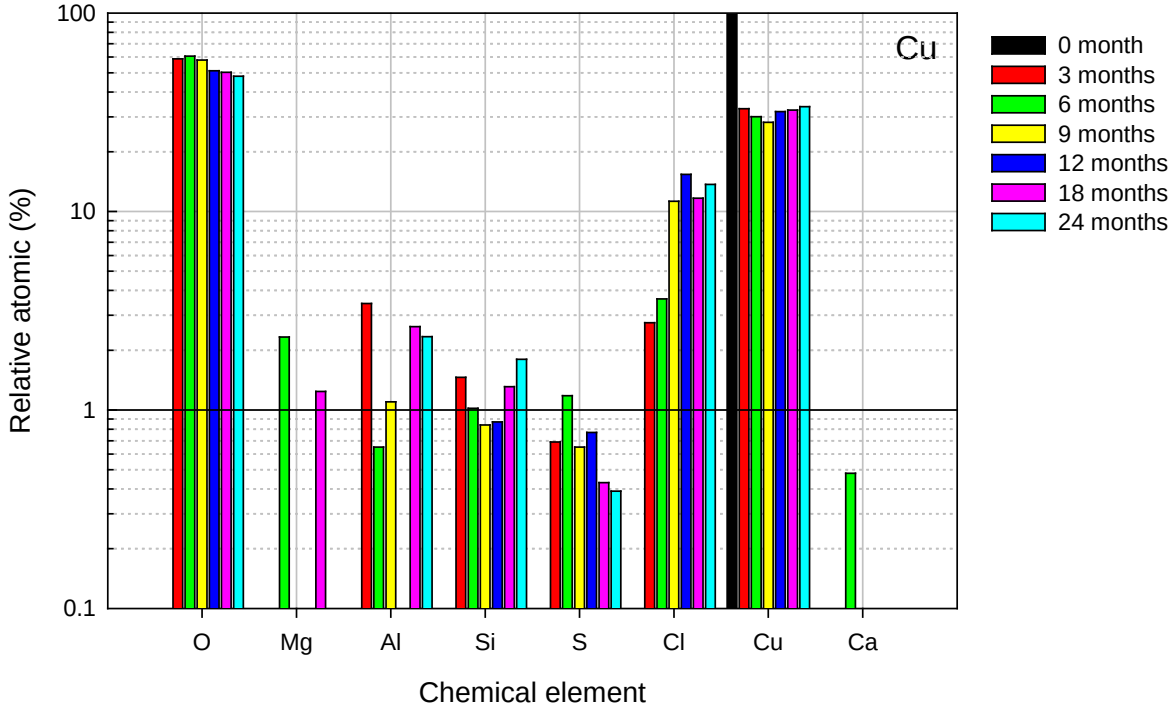


Figure J- 11. EDS of pure copper samples retrieved from Pt. Judith exposure site.

Distribution Statement A. Approved for Public Release.

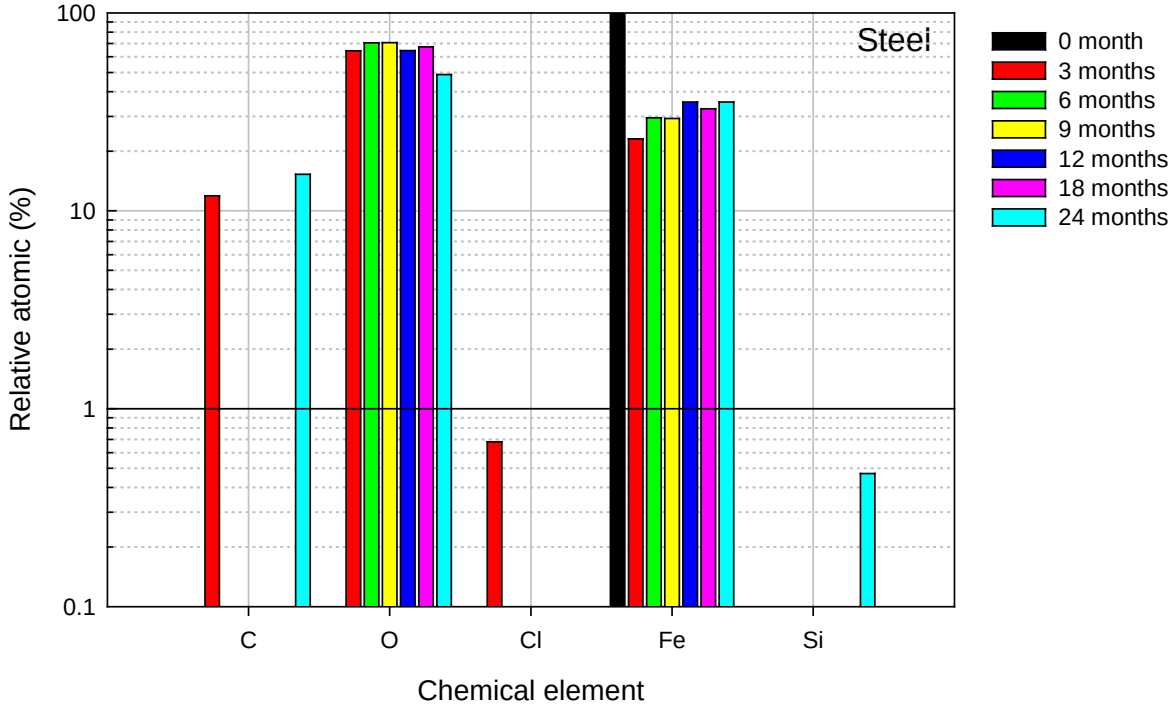


Figure J- 12. EDS of 1010 steel samples retrieved from Pt. Judith exposure site.

Distribution Statement A. Approved for Public Release.

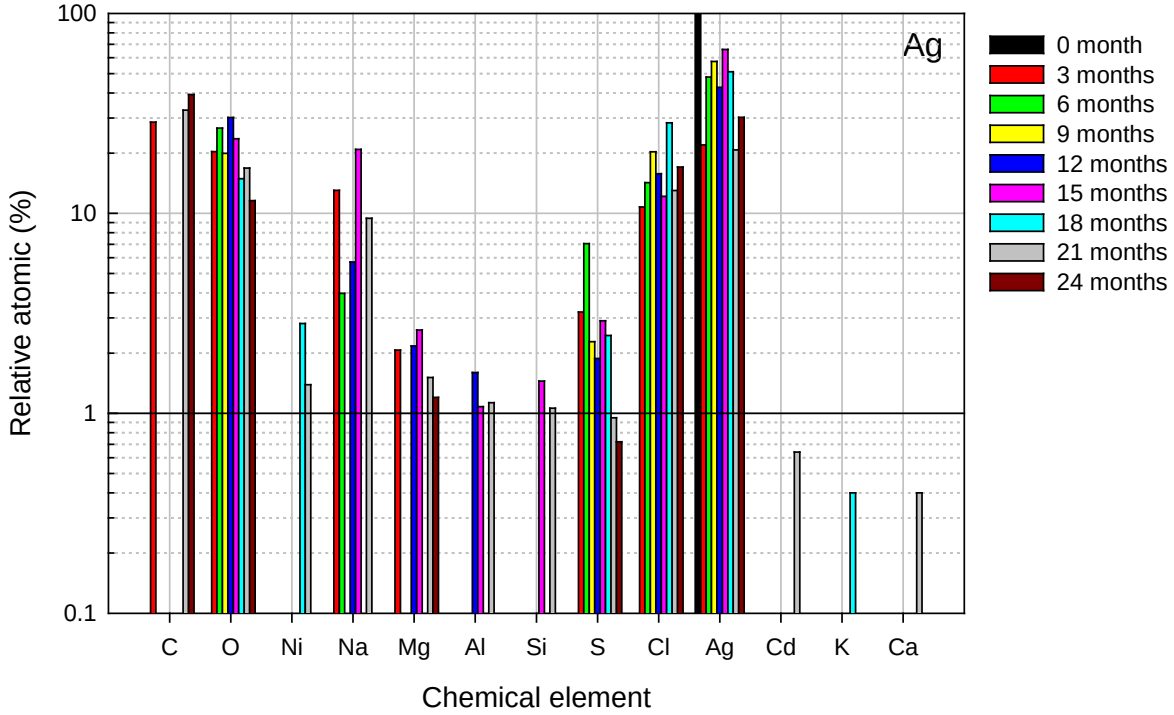


Figure J- 13. EDS of pure silver samples retrieved from East Coast Ship exposure site.

Distribution Statement A. Approved for Public Release.

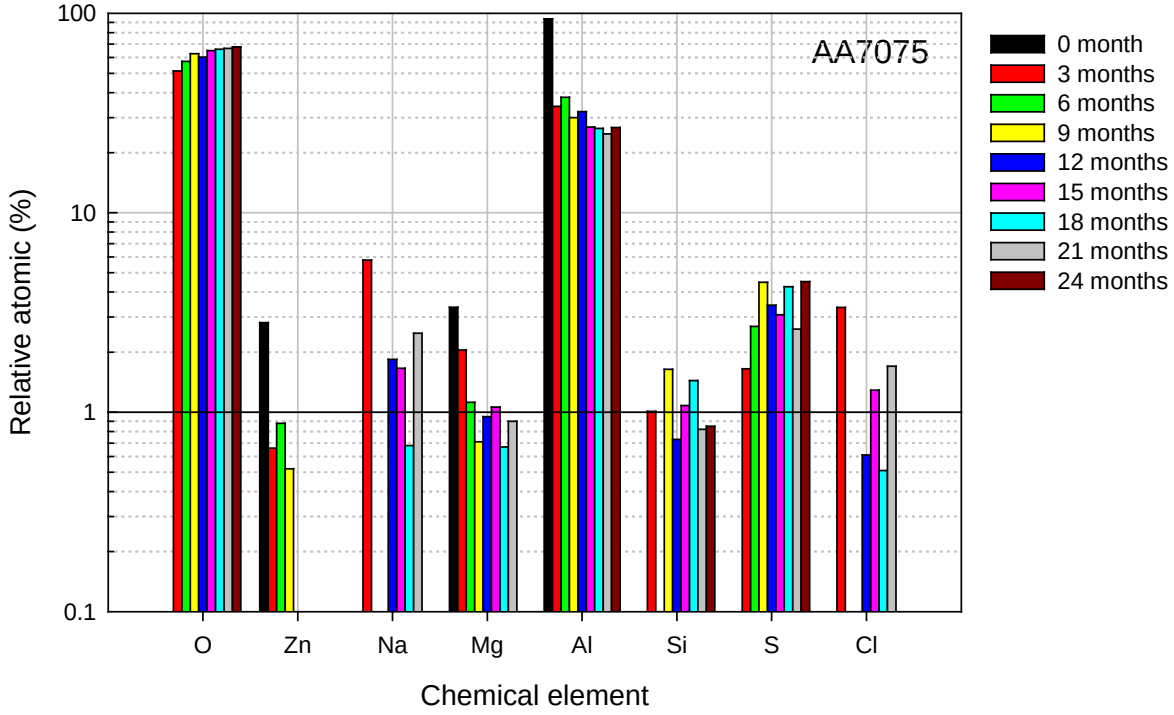


Figure J- 14. EDS of aluminum alloy 7075 samples retrieved from East Coast Ship exposure site.

Distribution Statement A. Approved for Public Release.

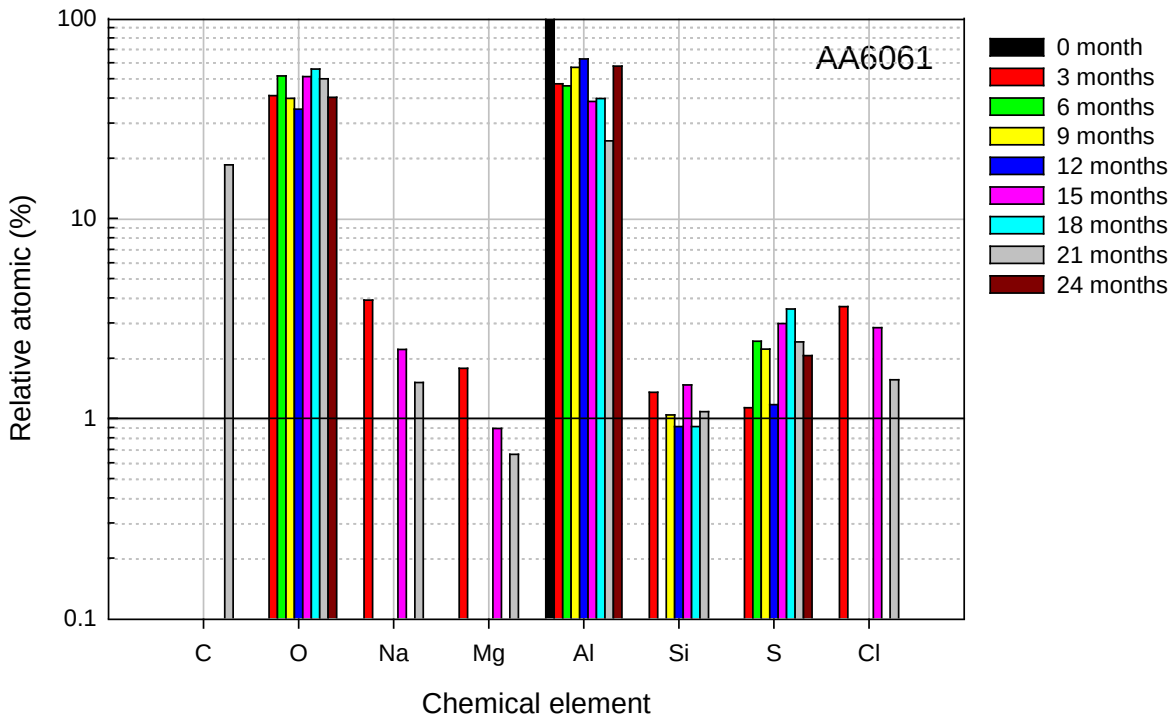


Figure J- 15. EDS of aluminum alloy 6061 samples retrieved from East Coast Ship exposure site.

Distribution Statement A. Approved for Public Release.

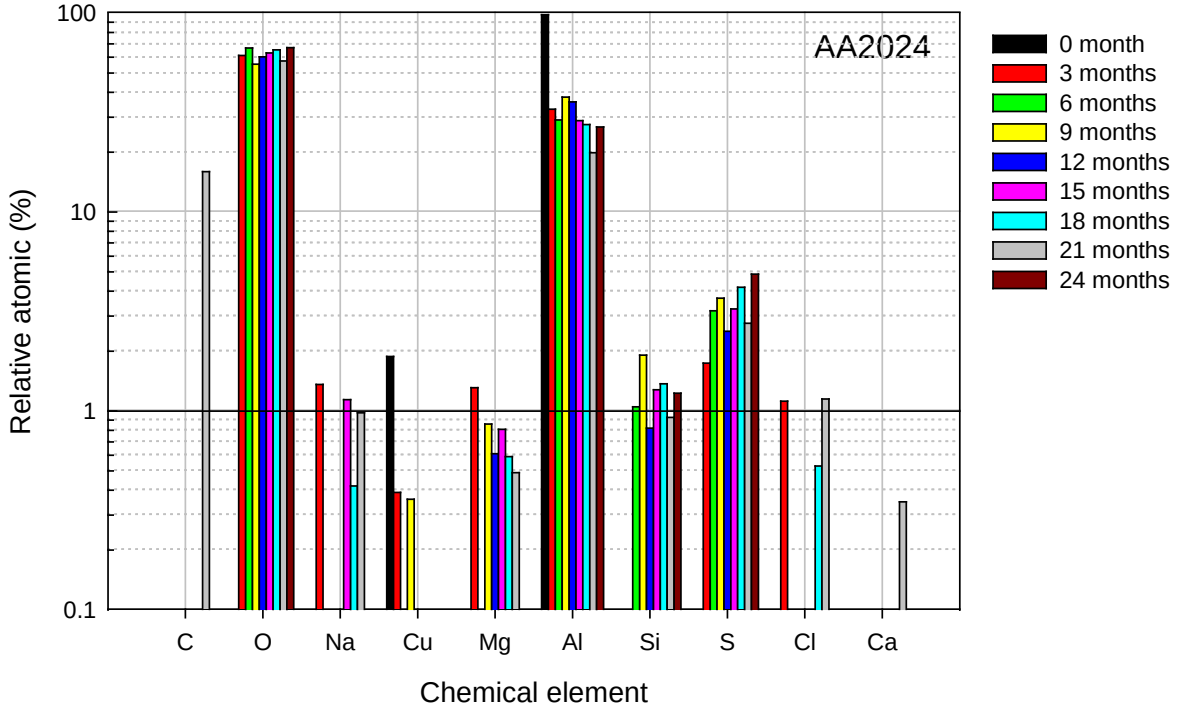


Figure J- 16. EDS of aluminum alloy 2024 samples retrieved from East Coast Ship exposure site.

Distribution Statement A. Approved for Public Release.

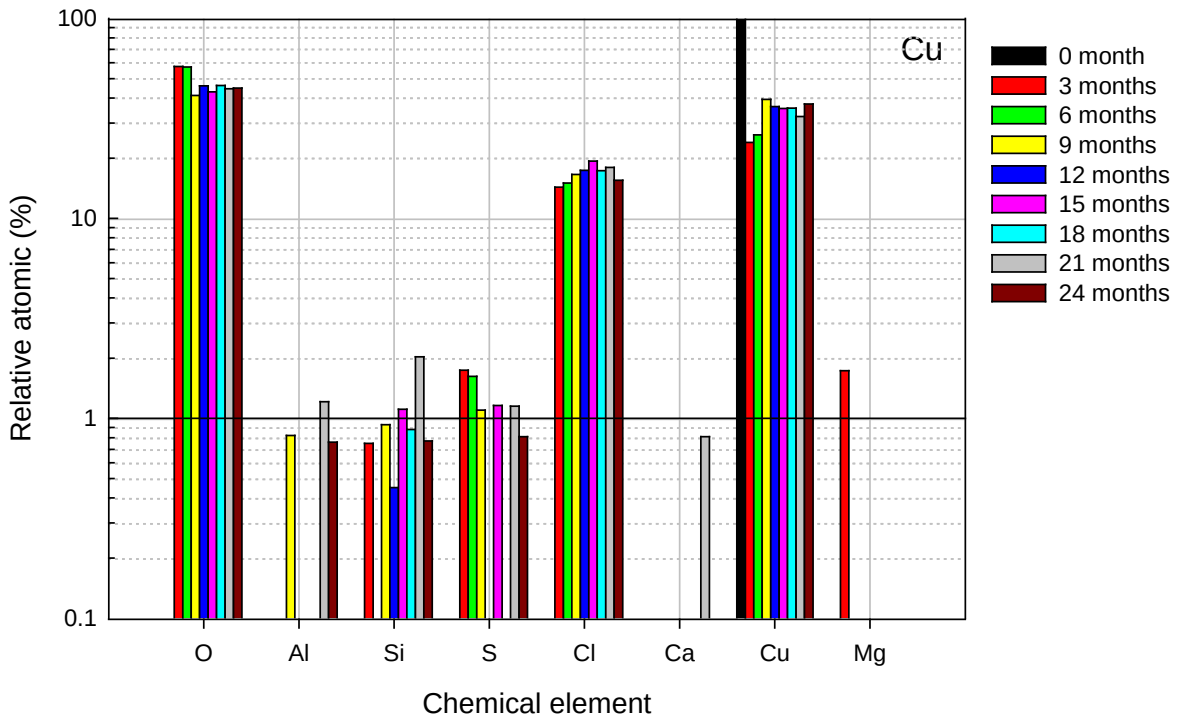


Figure J- 17. EDS of pure copper samples retrieved from East Coast Ship exposure site.

Distribution Statement A. Approved for Public Release.

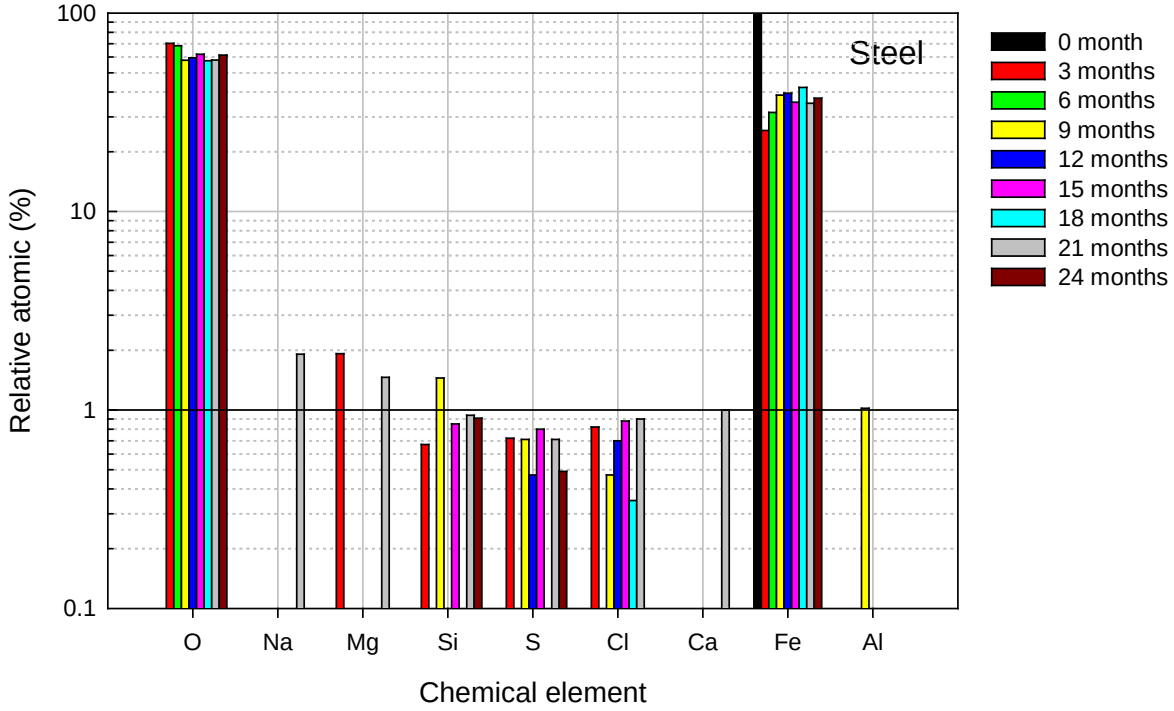


Figure J- 18. EDS of 1010 steel samples retrieved from Pt. Judith exposure site.

Distribution Statement A. Approved for Public Release.

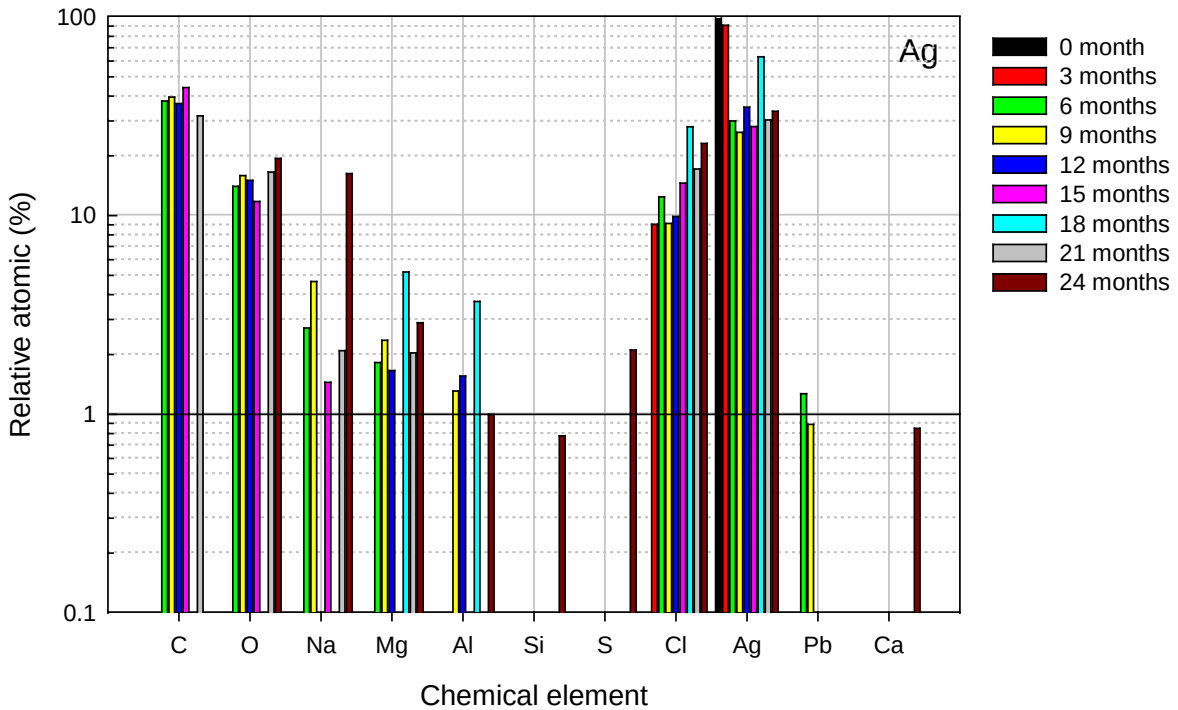


Figure J- 19. EDS of pure silver samples retrieved from West Coast Ship exposure site.

Distribution Statement A. Approved for Public Release.

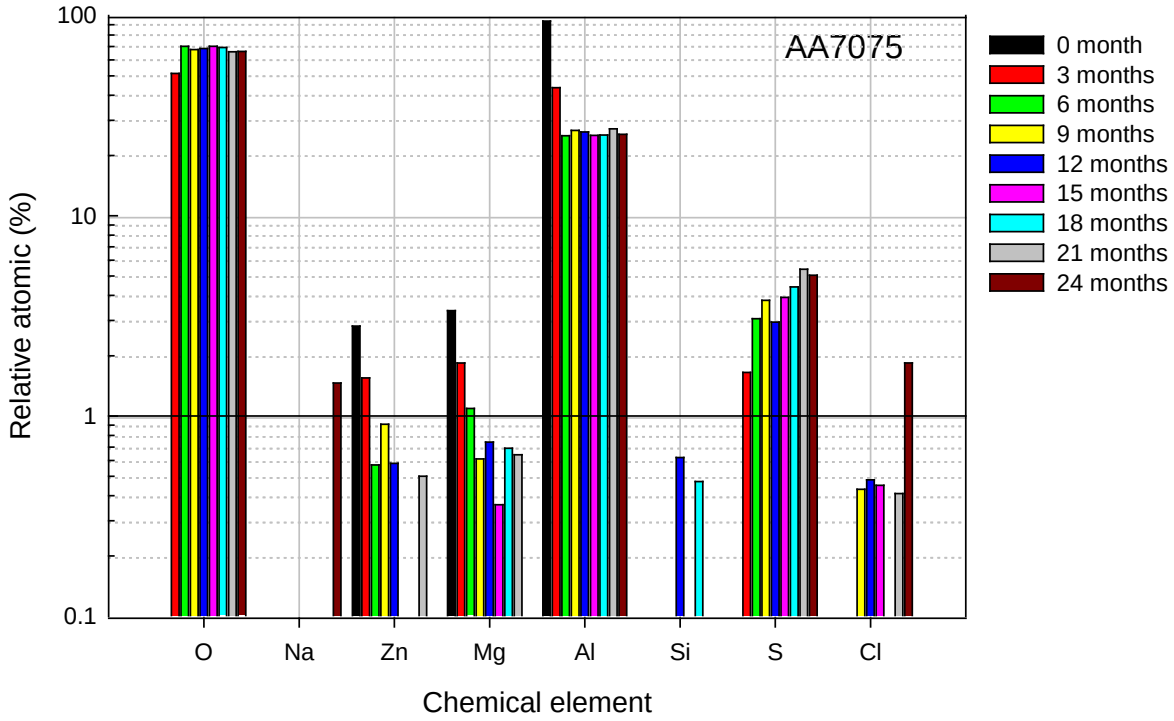


Figure J- 20. EDS of aluminum alloy 7075 samples retrieved from West Coast Ship exposure site.

Distribution Statement A. Approved for Public Release.

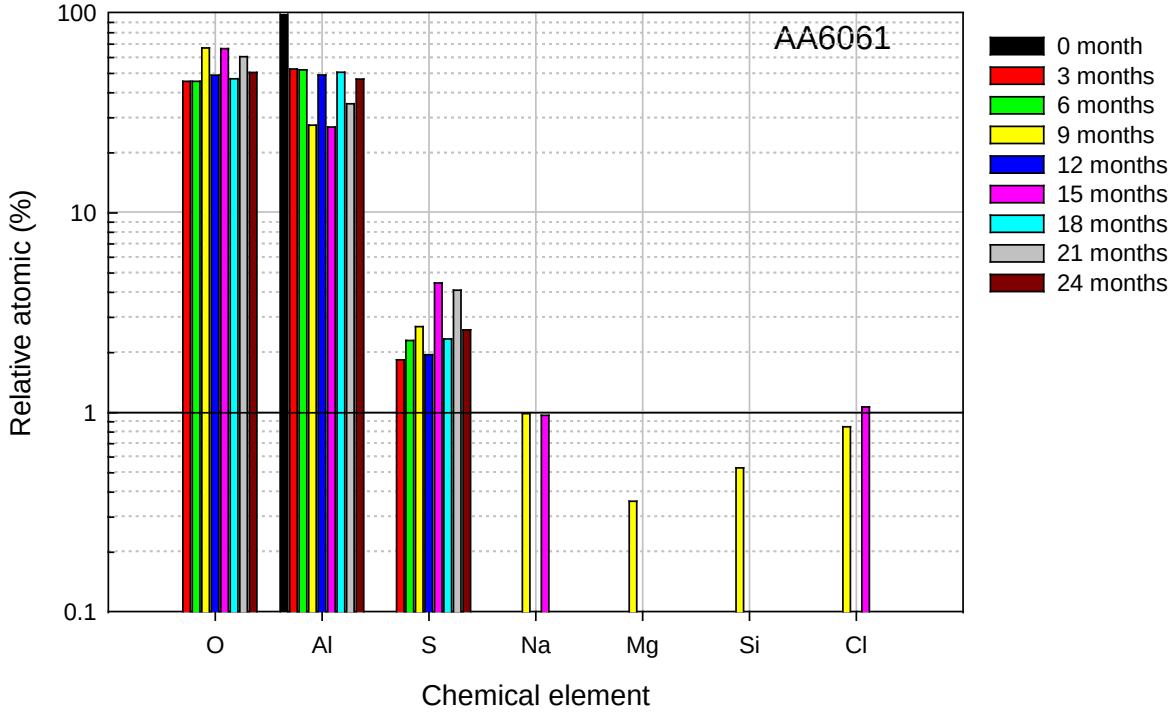


Figure J- 21. EDS of aluminum alloy 6061 samples retrieved from West Coast Ship exposure site.

Distribution Statement A. Approved for Public Release.

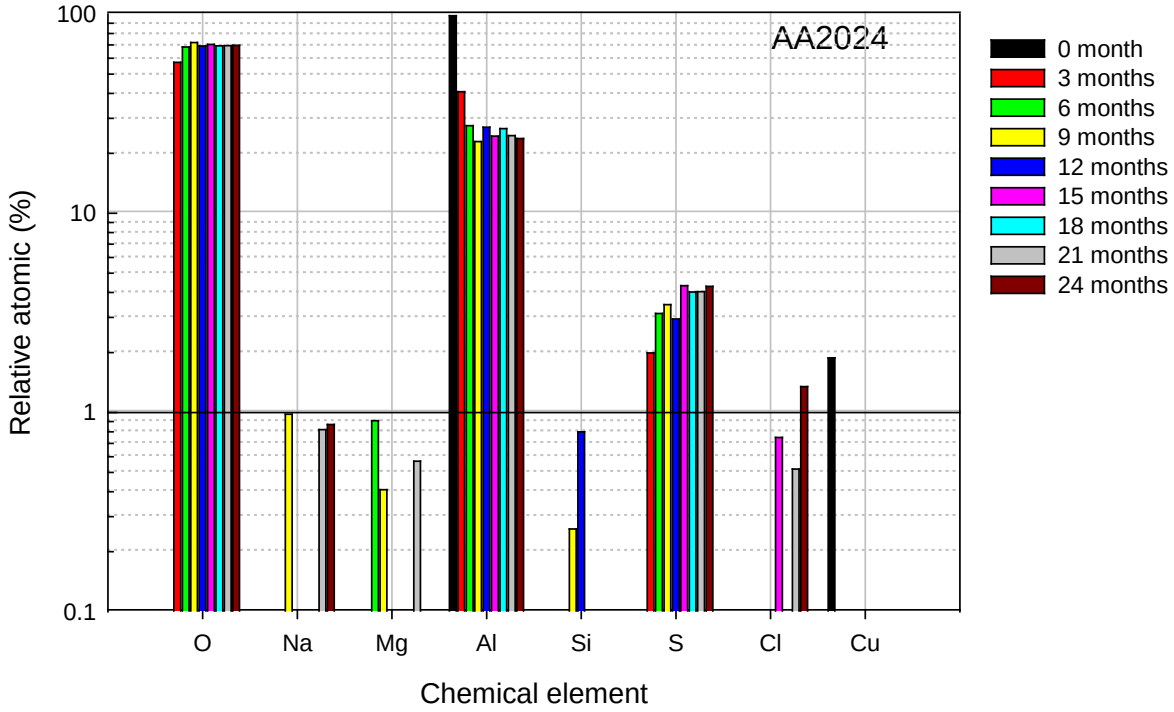


Figure J- 22. EDS of aluminum alloy 2024 samples retrieved from West Coast Ship exposure site.

Distribution Statement A. Approved for Public Release.

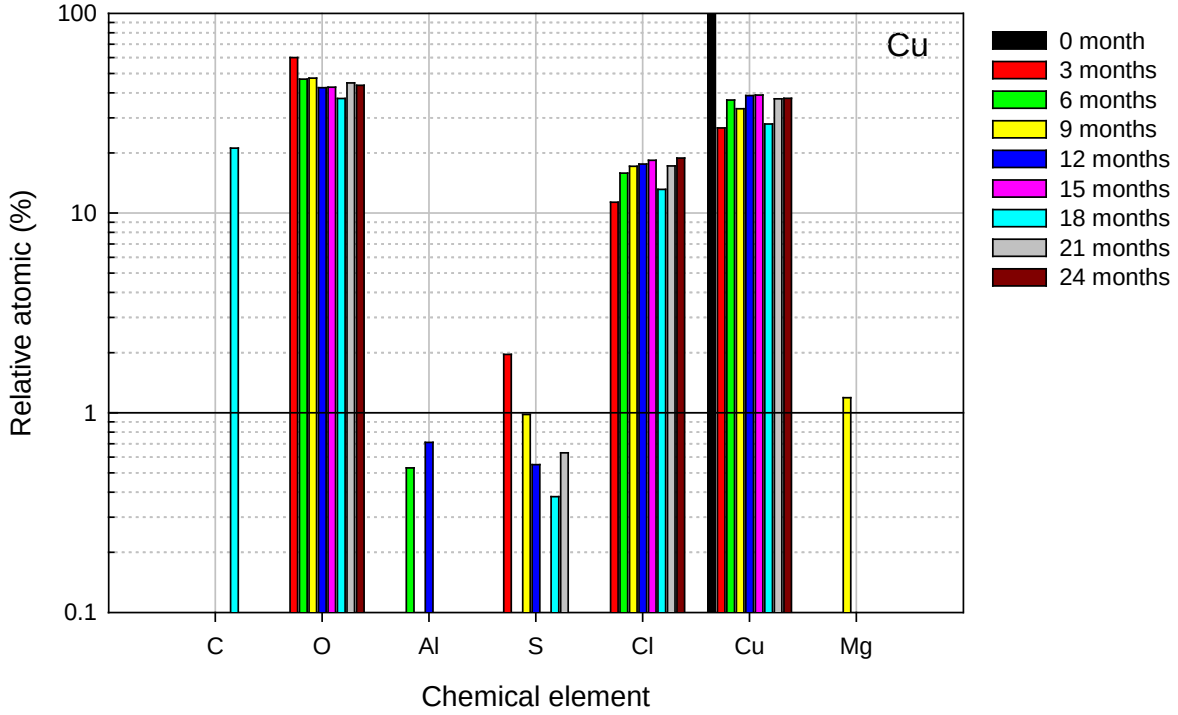


Figure J- 23. EDS of pure copper samples retrieved from West Coast Ship exposure site.

Distribution Statement A. Approved for Public Release.

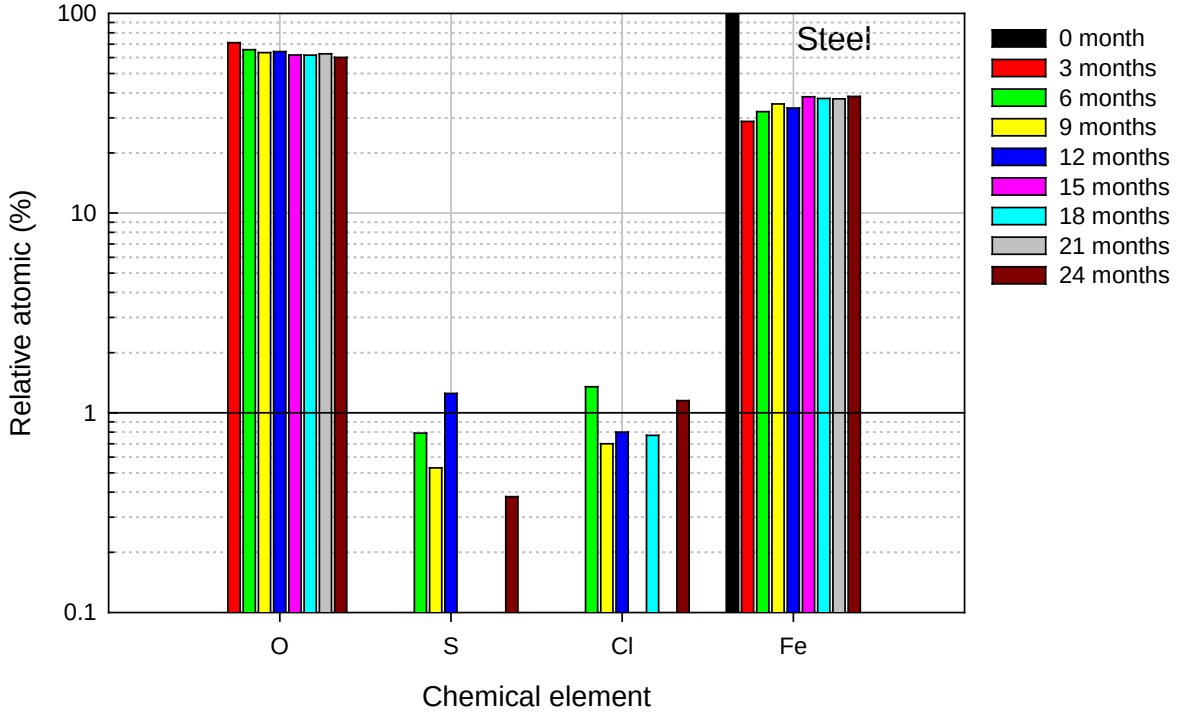


Figure J- 24. EDS of 1010 steel samples retrieved from West Coast Ship exposure site.

Distribution Statement A. Approved for Public Release.

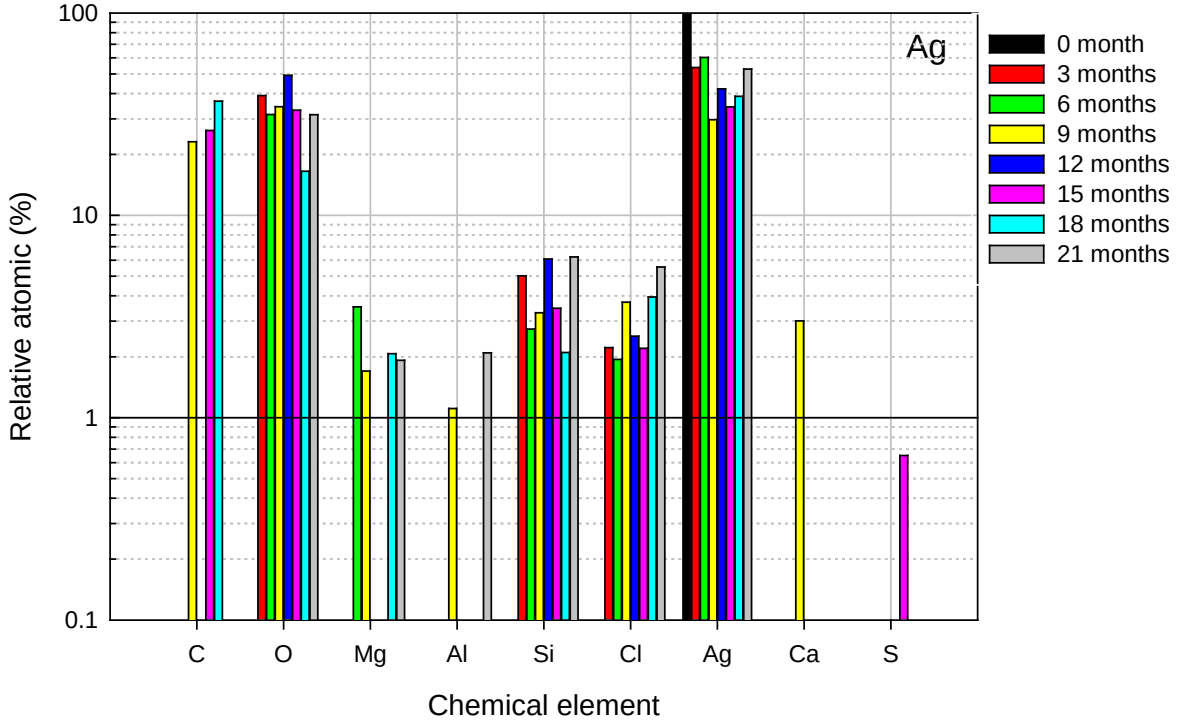


Figure J- 25. EDS of pure silver samples retrieved from Kirtland AFB exposure site.

Distribution Statement A. Approved for Public Release.

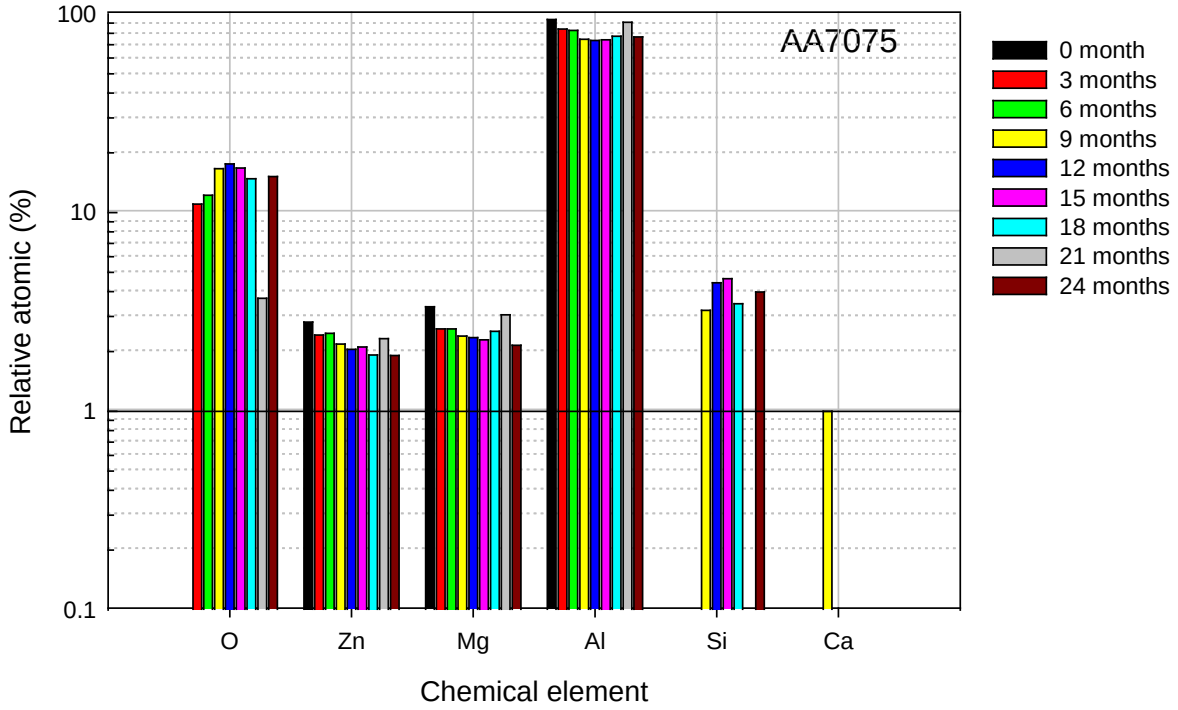


Figure J- 26. EDS of aluminum alloy 7075 samples retrieved from Kirtland AFB exposure site.

Distribution Statement A. Approved for Public Release.

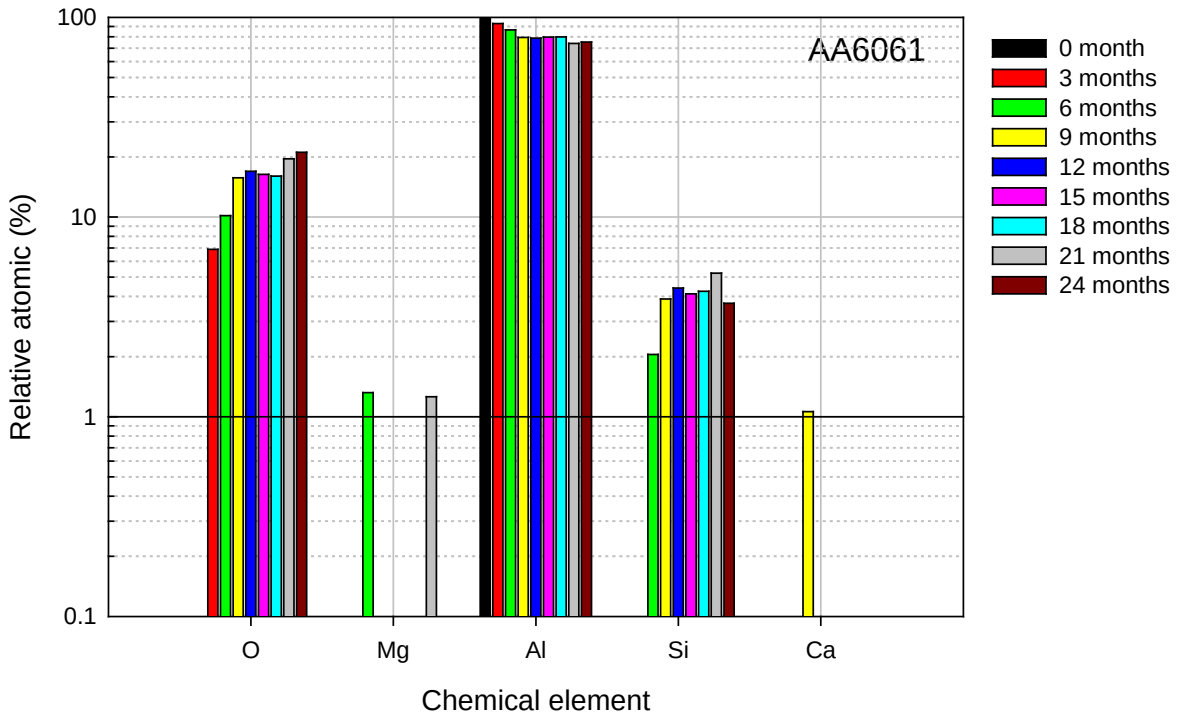


Figure J- 27. EDS of aluminum alloy 6061 samples retrieved from Kirtland AFB exposure site.

Distribution Statement A. Approved for Public Release.

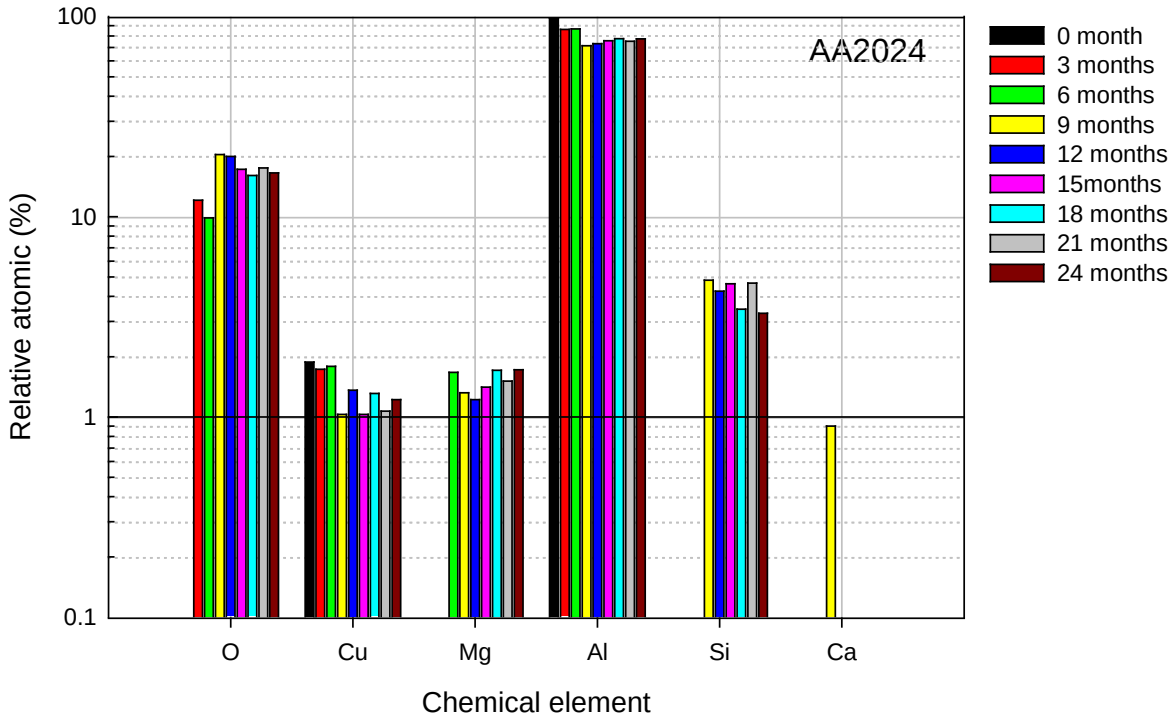


Figure J- 28. EDS of aluminum alloy 2024 samples retrieved from Kirtland AFB exposure site.

Distribution Statement A. Approved for Public Release.

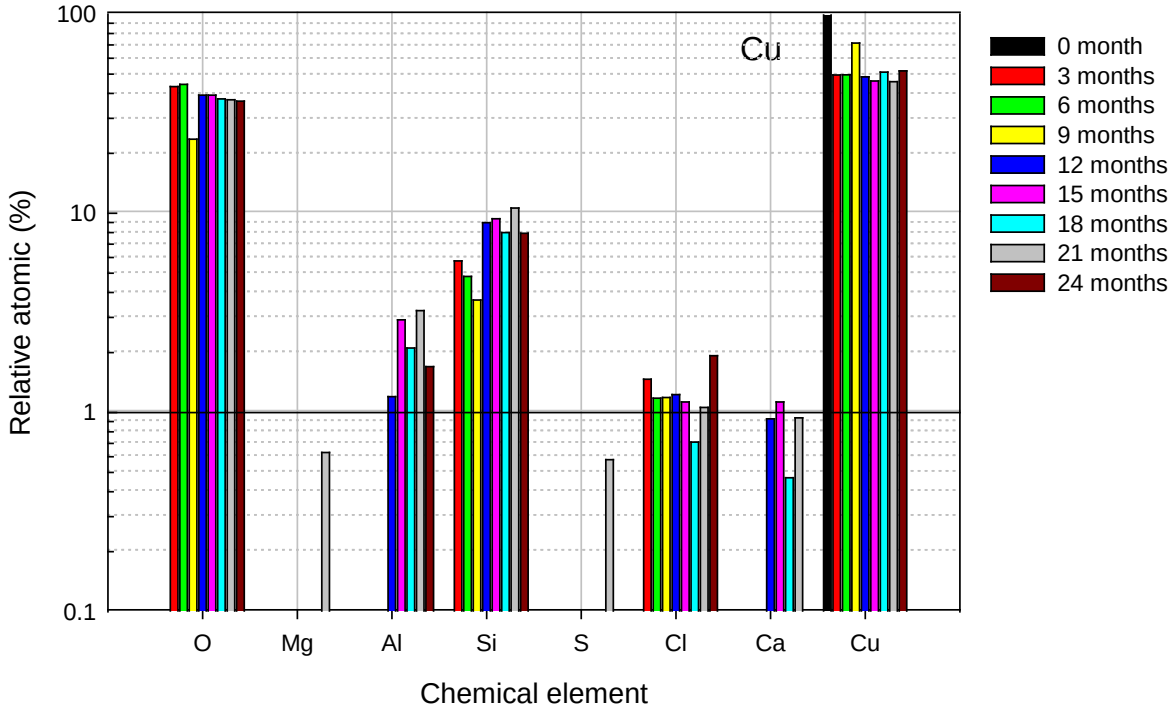


Figure J- 29. EDS of pure copper samples retrieved from Kirtland AFB exposure site.

Distribution Statement A. Approved for Public Release.

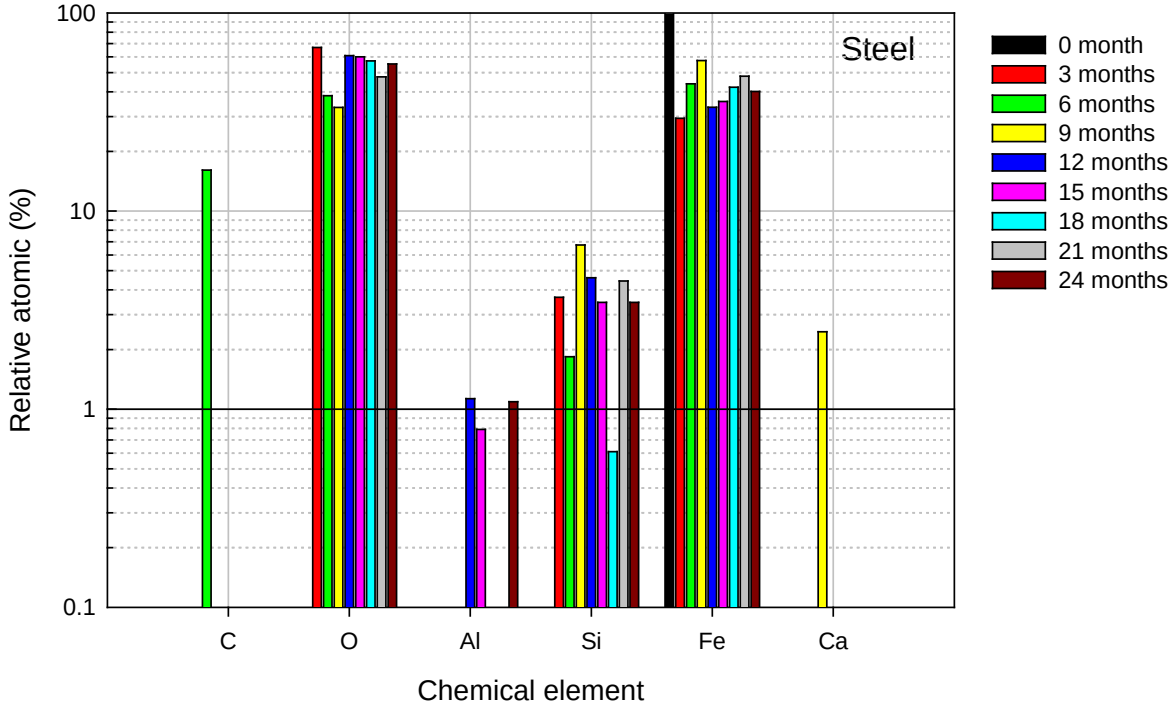


Figure J- 30. EDS of 1010 steel samples retrieved from Kirtland AFB exposure site.

Distribution Statement A. Approved for Public Release.

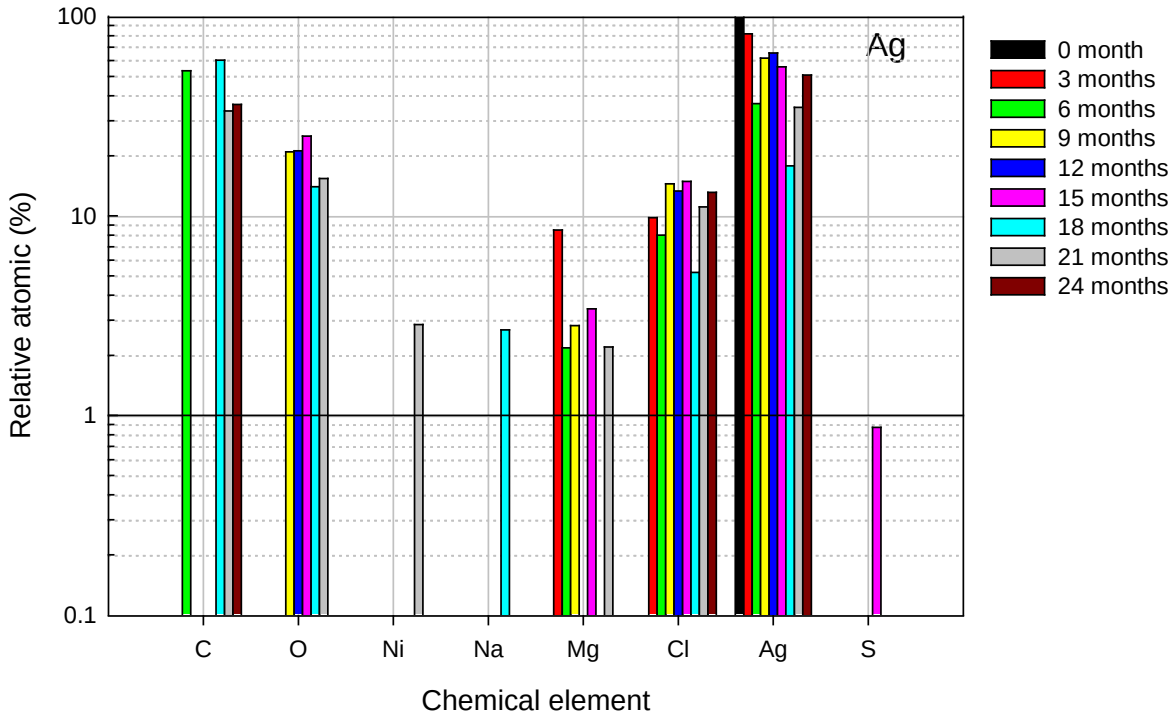


Figure J- 31. EDS of pure silver samples retrieved from Hickam AFB exposure site.

Distribution Statement A. Approved for Public Release.

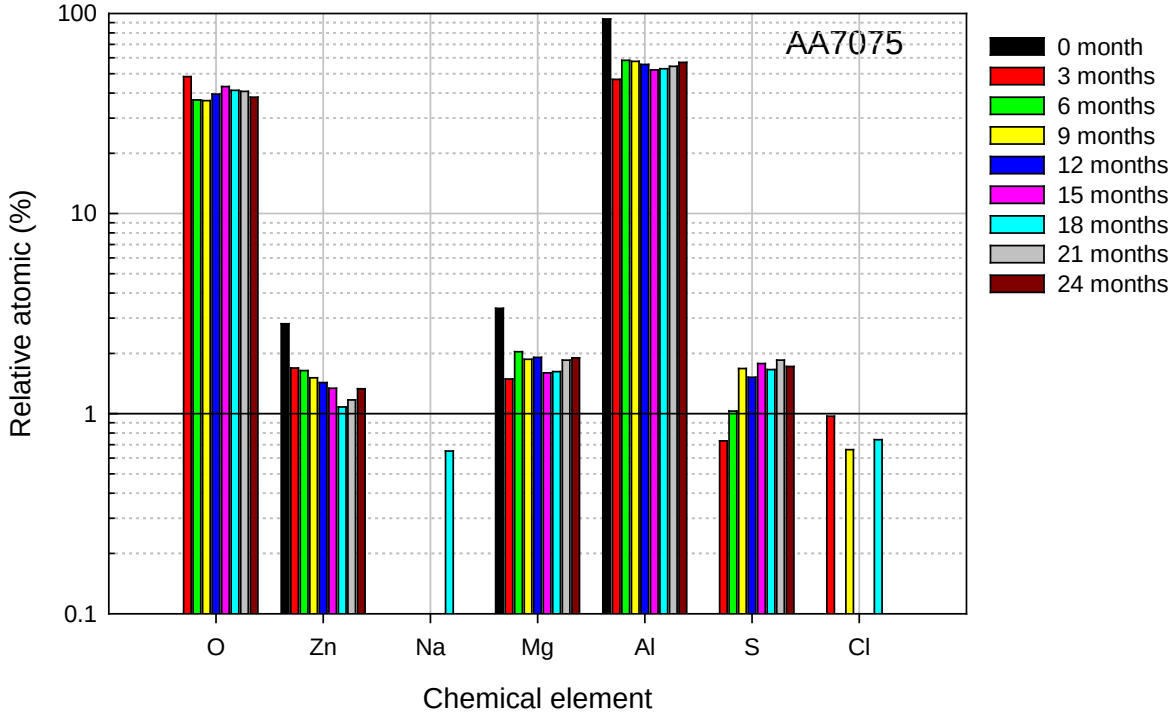


Figure J- 32. EDS of aluminum alloy 7075 samples retrieved from Hickam AFB exposure site.

Distribution Statement A. Approved for Public Release.

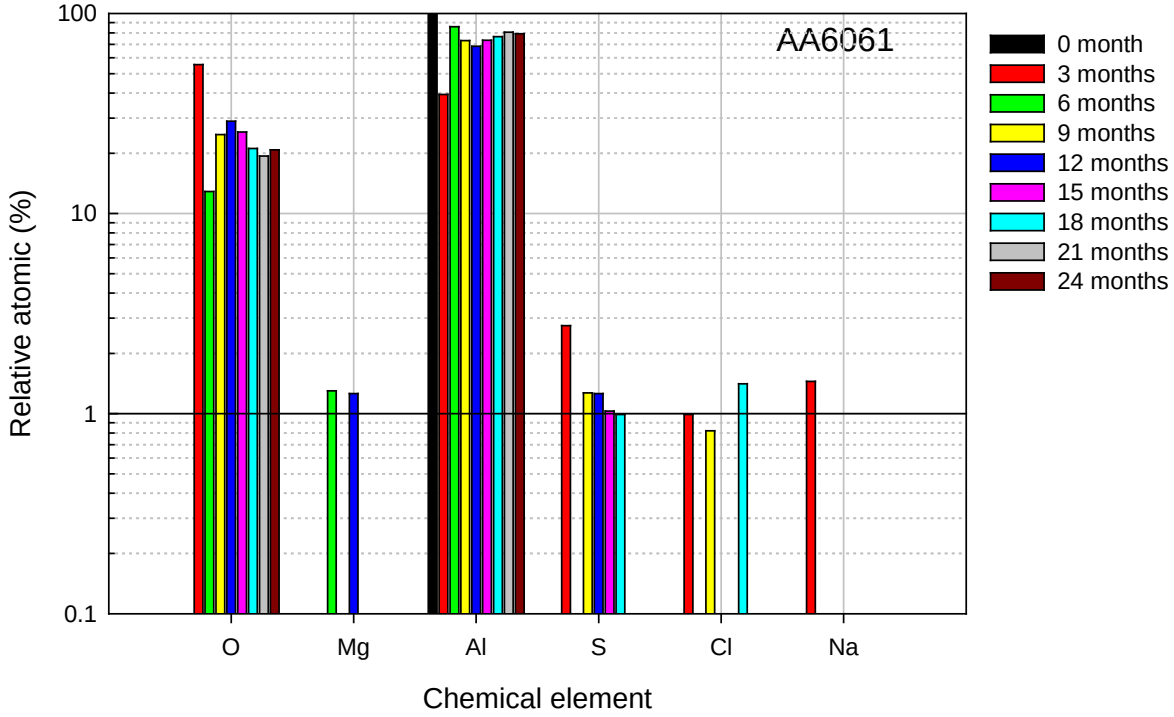


Figure J- 33. EDS of aluminum alloy 6061 samples retrieved from Hickam AFB exposure site.

Distribution Statement A. Approved for Public Release.

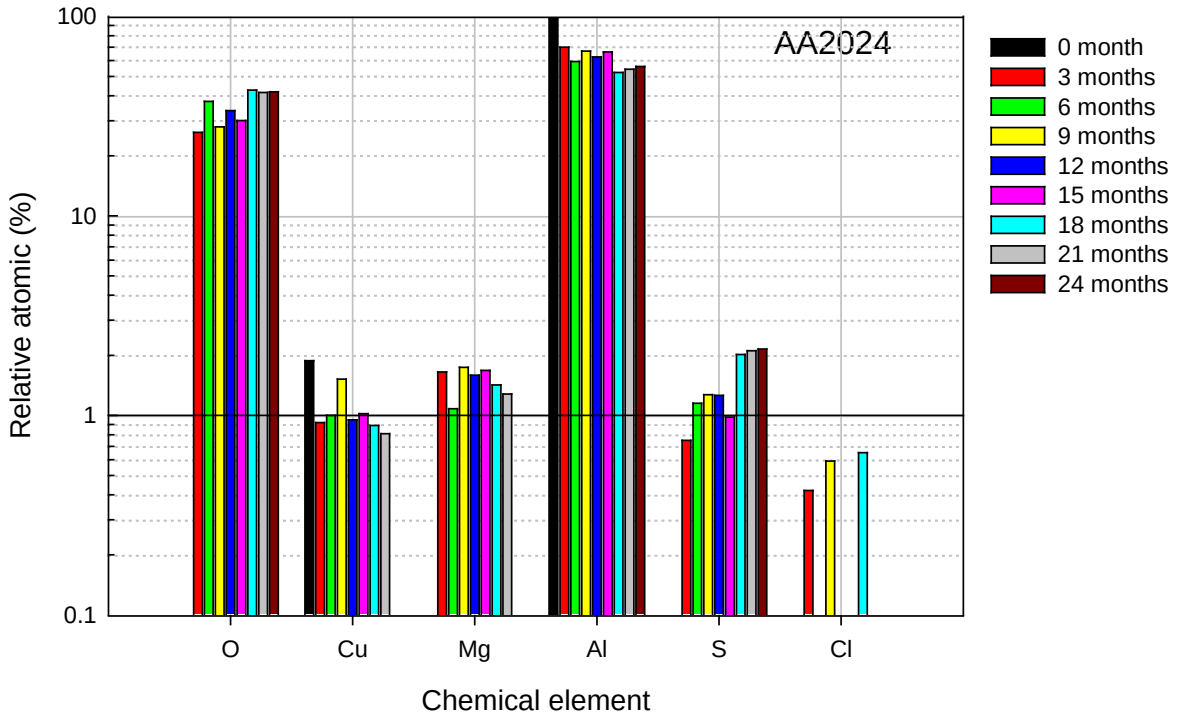


Figure J- 34. EDS of aluminum alloy 2024 samples retrieved from Hickam AFB exposure site.

Distribution Statement A. Approved for Public Release.

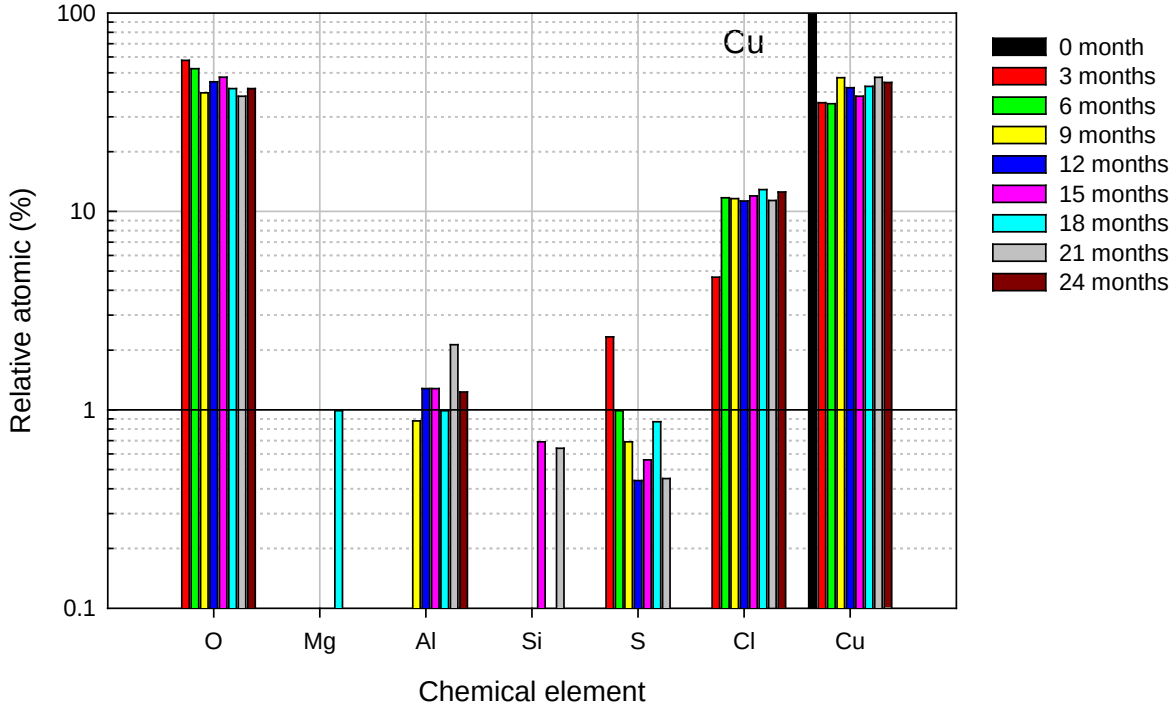


Figure J- 35. EDS of pure copper samples retrieved from Hickam AFB exposure site.

Distribution Statement A. Approved for Public Release.

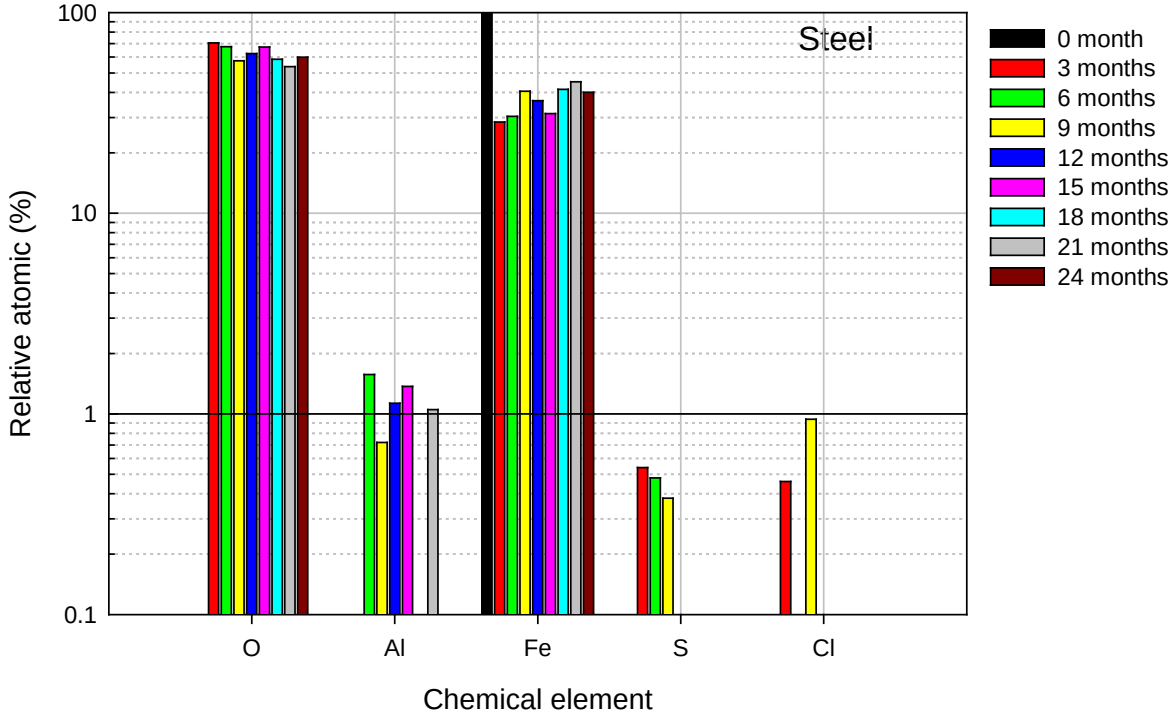


Figure J- 36. EDS of 1010 steel samples retrieved from Hickam AFB exposure site.

Distribution Statement A. Approved for Public Release.

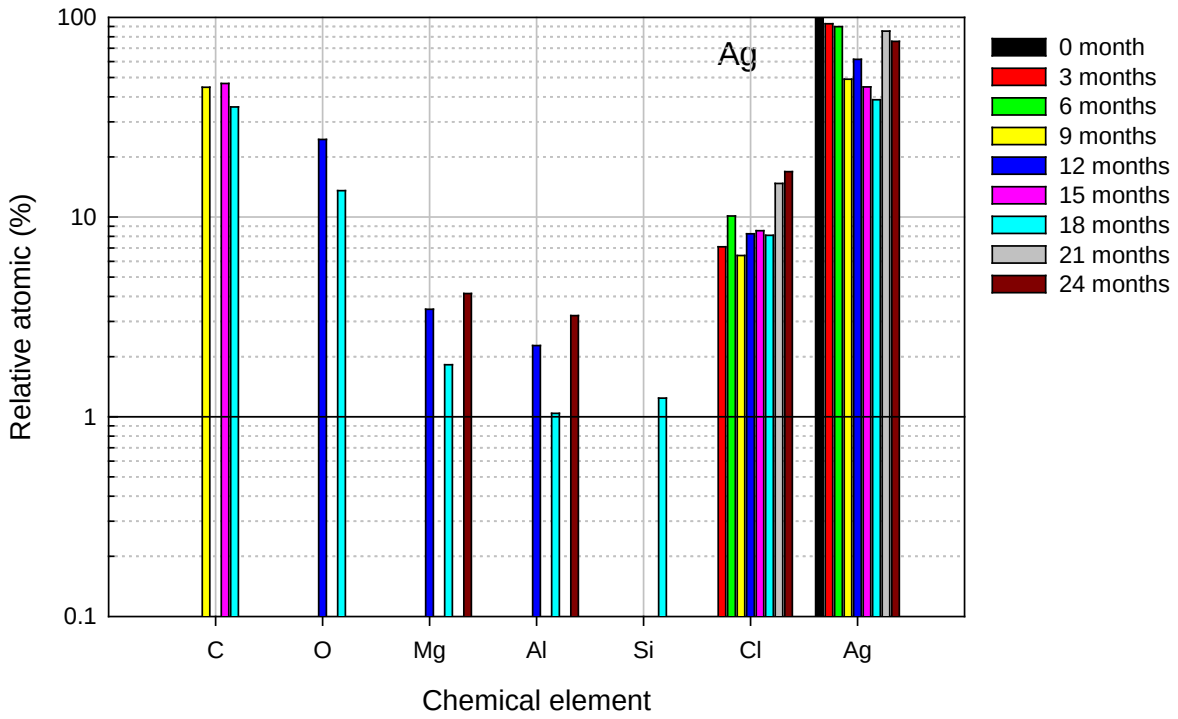


Figure J- 37. EDS of pure silver samples retrieved from Tyndall AFB exposure site.

Distribution Statement A. Approved for Public Release.

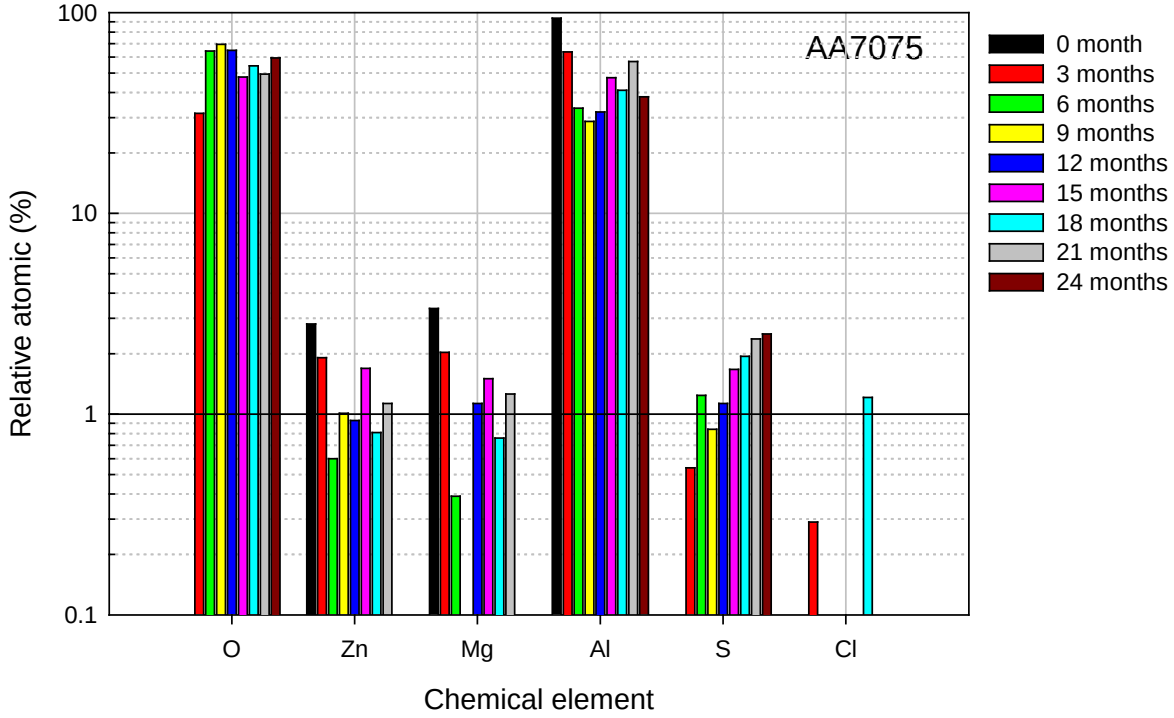


Figure J- 38. EDS of aluminum alloy 7075 samples retrieved from Tyndall AFB exposure site.

Distribution Statement A. Approved for Public Release.

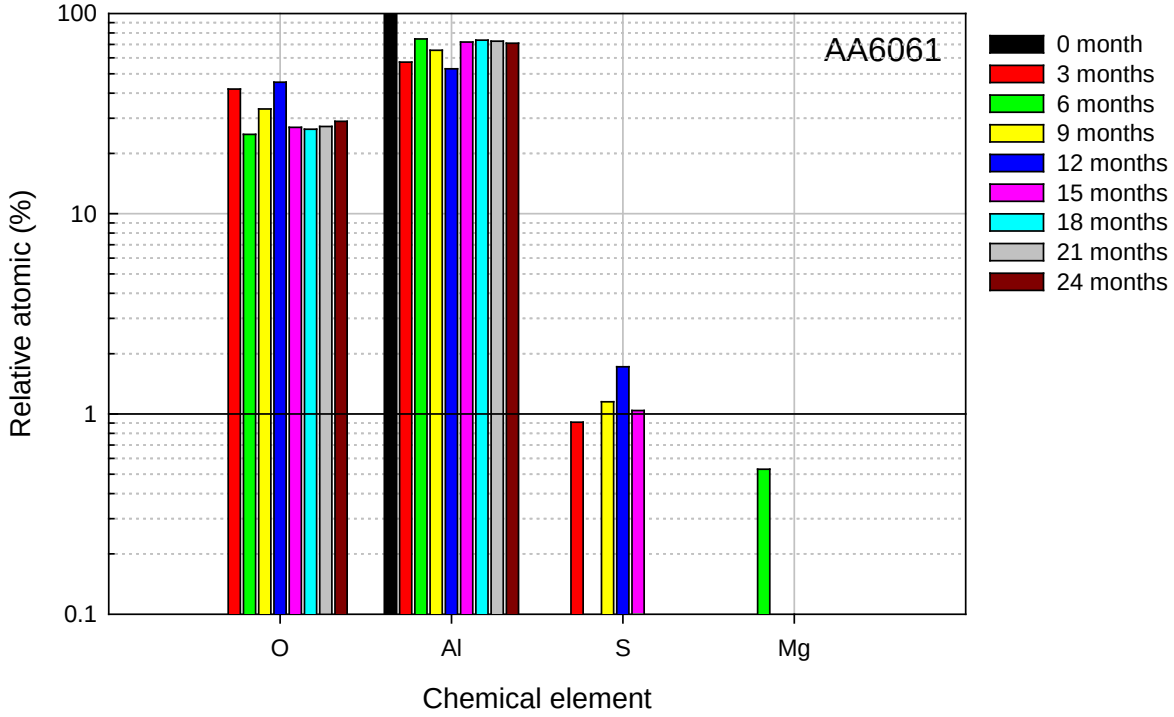


Figure J- 39. EDS of aluminum alloy 6061 samples retrieved from Tyndall AFB exposure site.

Distribution Statement A. Approved for Public Release.

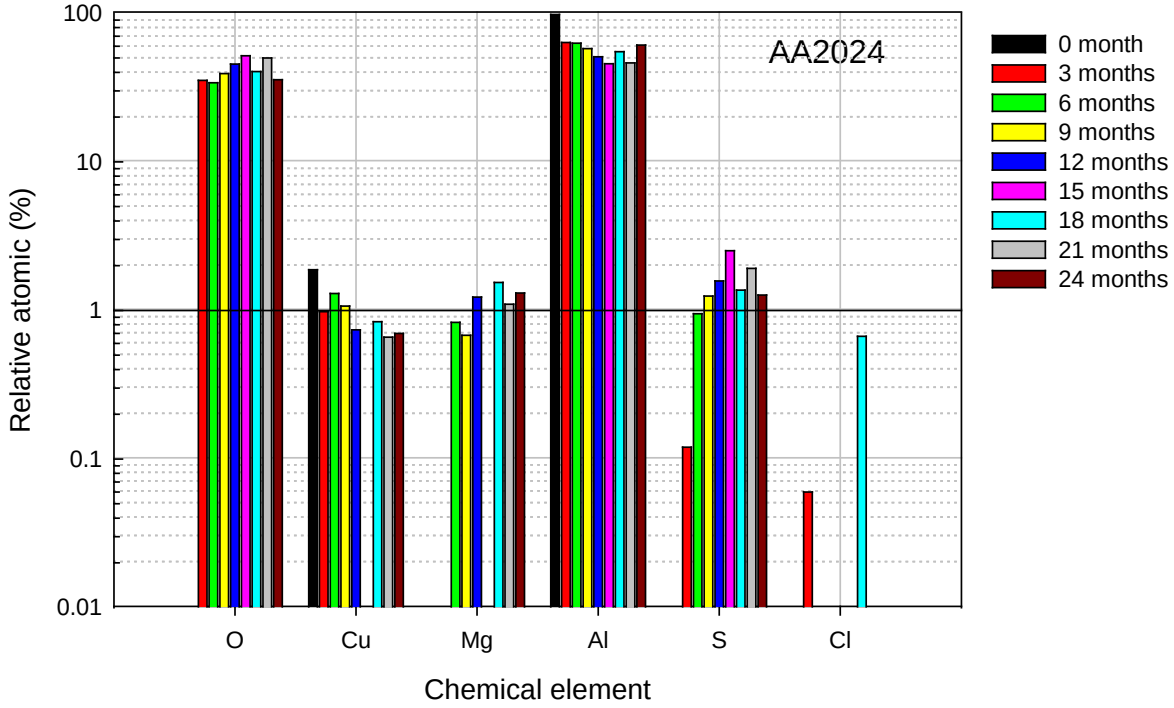


Figure J- 40. EDS of aluminum alloy 2024 samples retrieved from Tyndall AFB exposure site.

Distribution Statement A. Approved for Public Release.

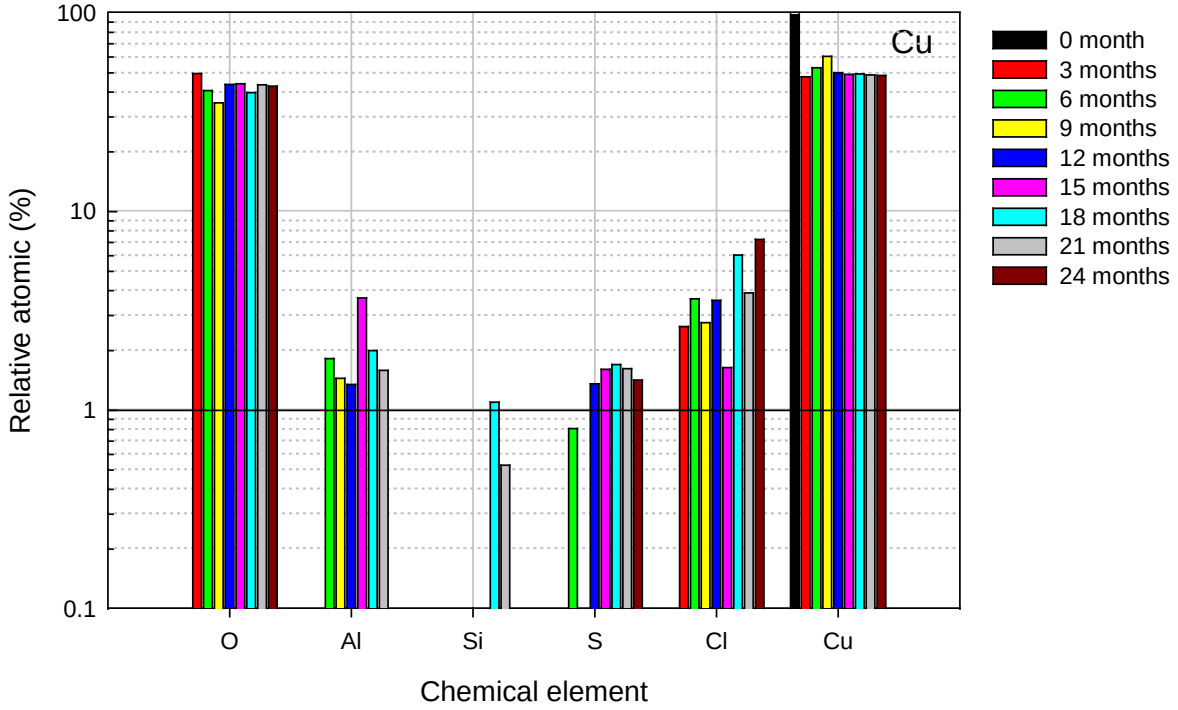


Figure J- 41. EDS of pure copper samples retrieved from Tyndall AFB exposure site.

Distribution Statement A. Approved for Public Release.

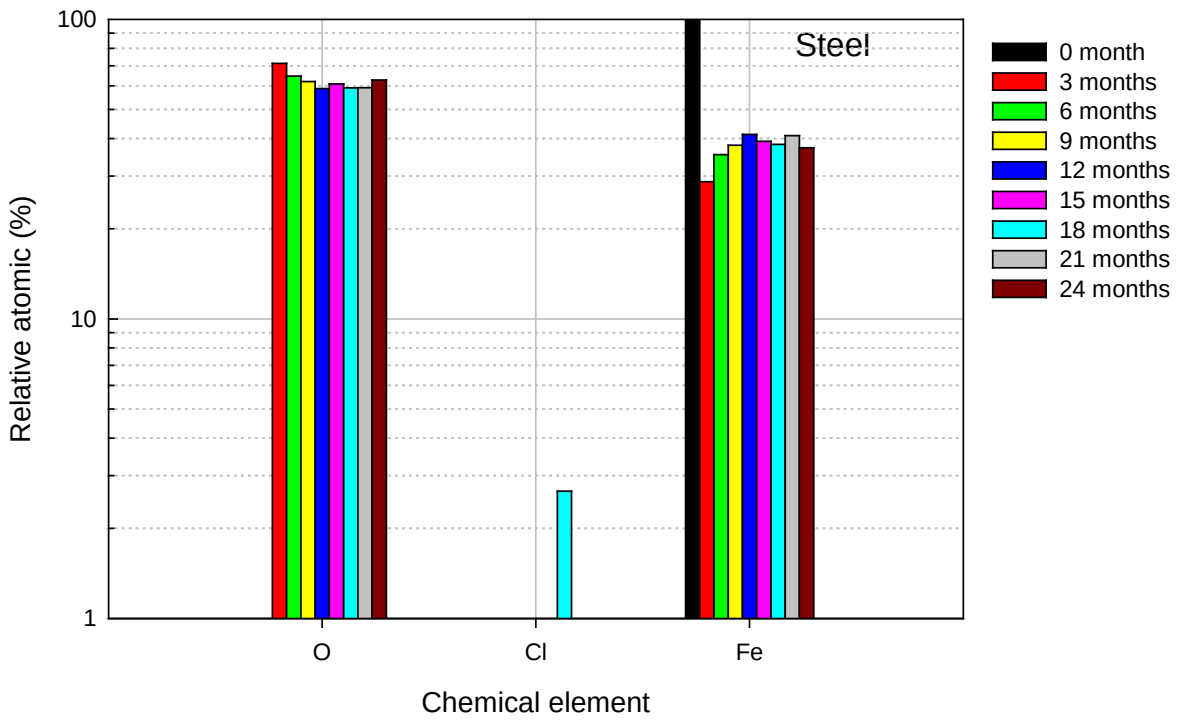


Figure J- 42. EDS of 1010 steel samples retrieved from Tyndall AFB exposure site.

Distribution Statement A. Approved for Public Release.

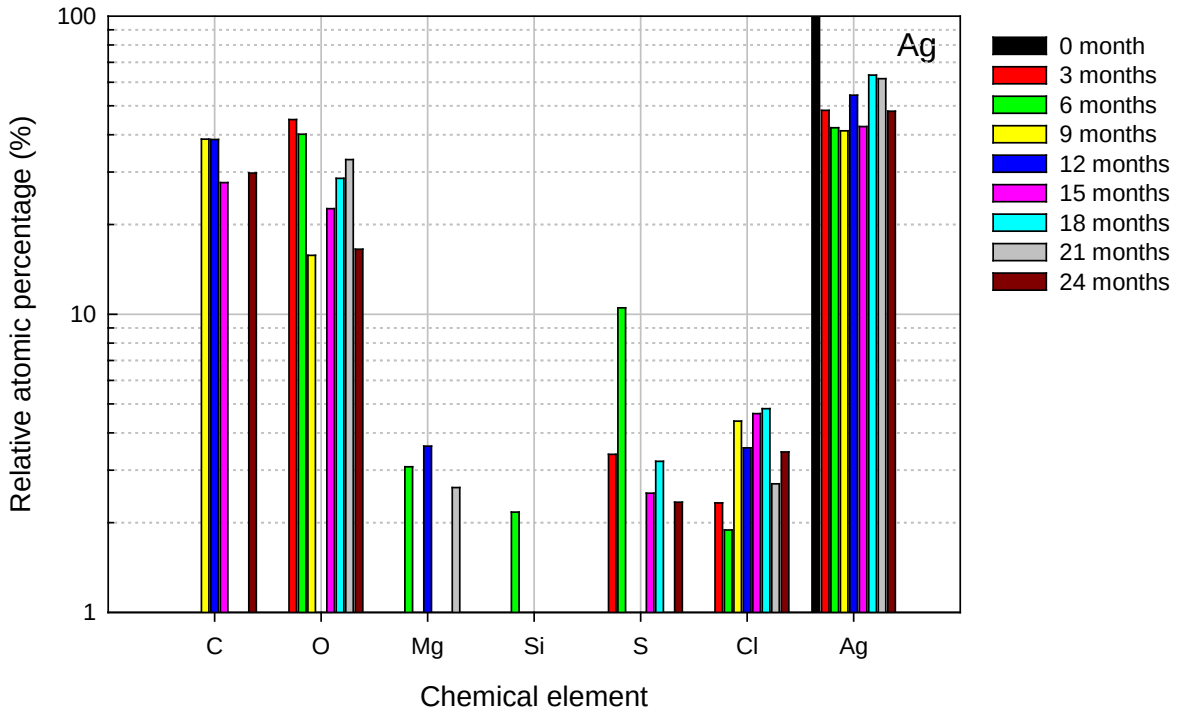


Figure J- 43. EDS of pure silver samples retrieved from Wright-Patterson AFB exposure site.

Distribution Statement A. Approved for Public Release.

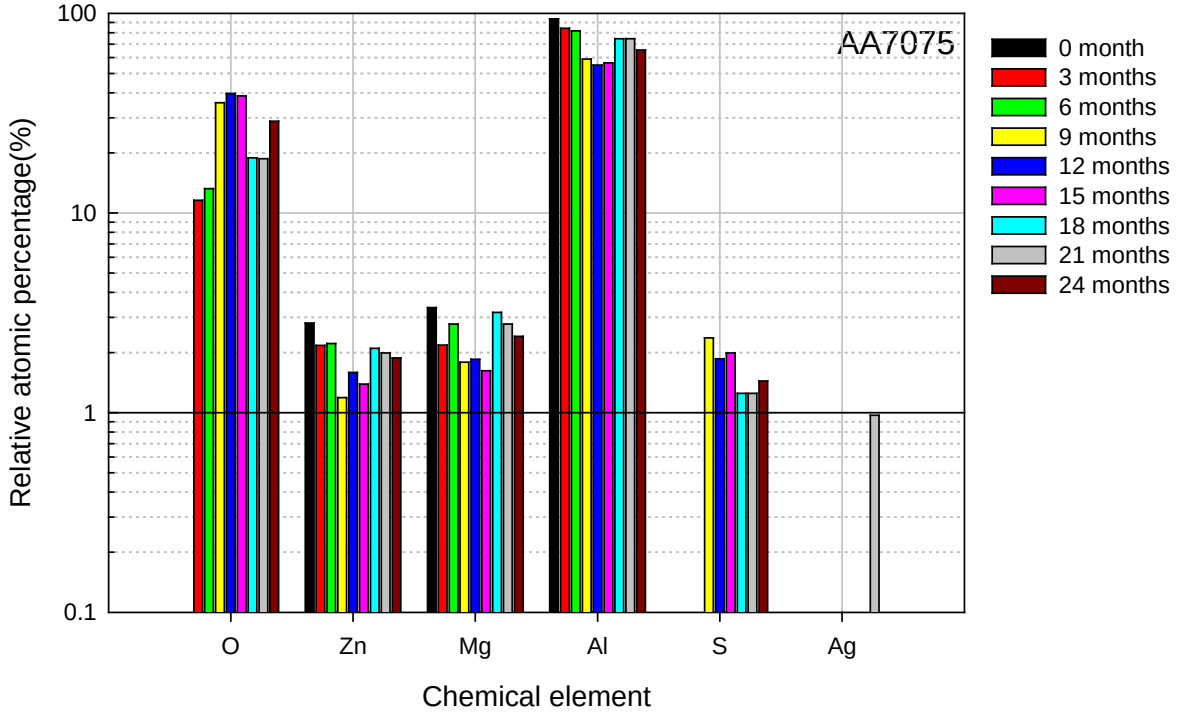


Figure J- 44. EDS of aluminum alloy 7075 samples retrieved from Wright-Patterson AFB exposure site.

Distribution Statement A. Approved for Public Release.

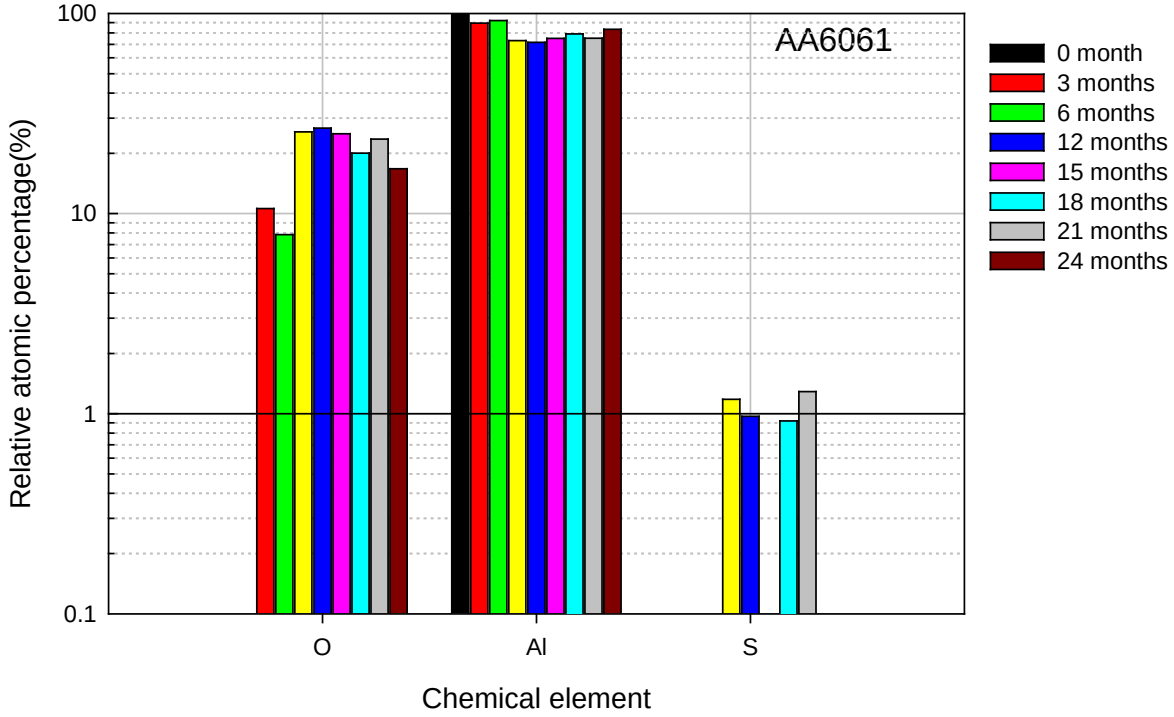


Figure J- 45. EDS of aluminum alloy 6061 samples retrieved from Wright-Patterson AFB exposure site.

Distribution Statement A. Approved for Public Release.

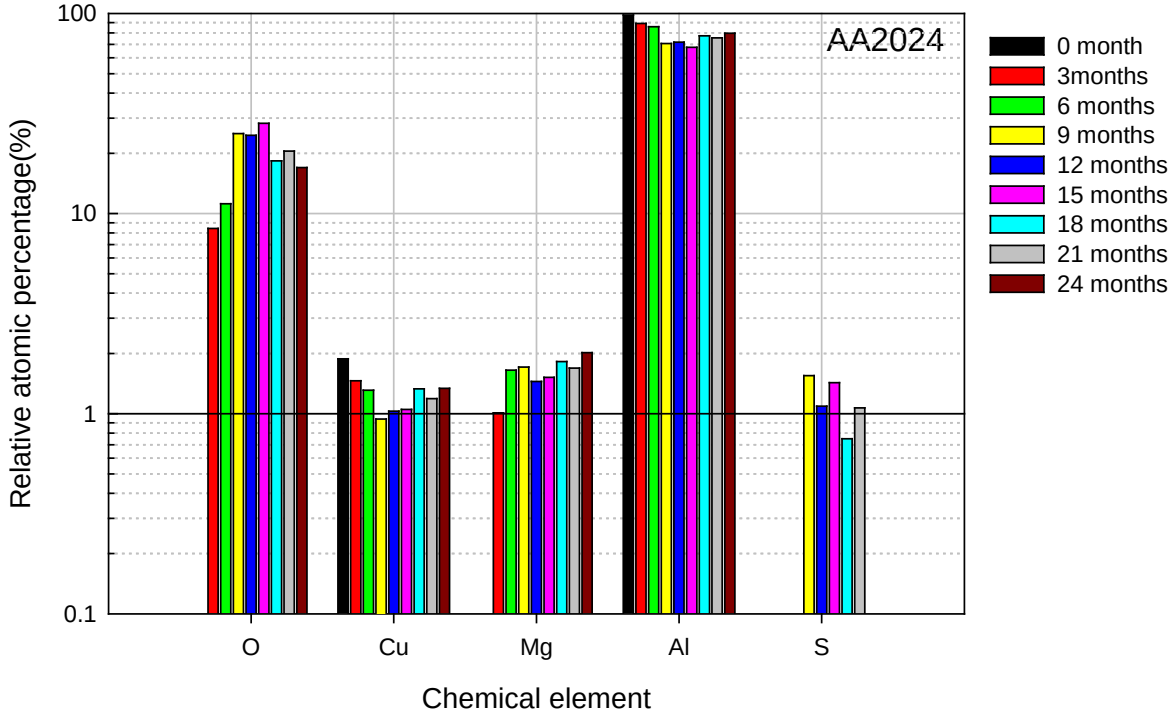


Figure J- 46. EDS of aluminum alloy 2024 samples retrieved from Wright-Patterson AFB exposure site.

Distribution Statement A. Approved for Public Release.

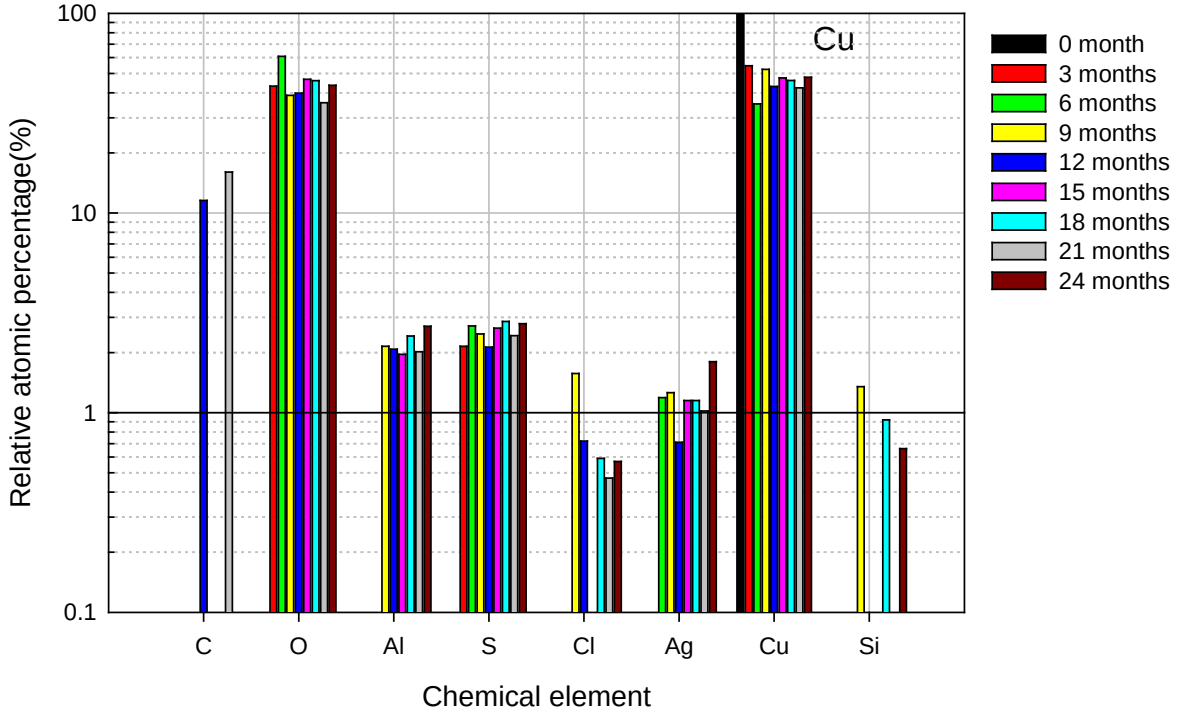


Figure J- 47. EDS of pure copper samples retrieved from Wright-Patterson AFB exposure site.

Distribution Statement A. Approved for Public Release.

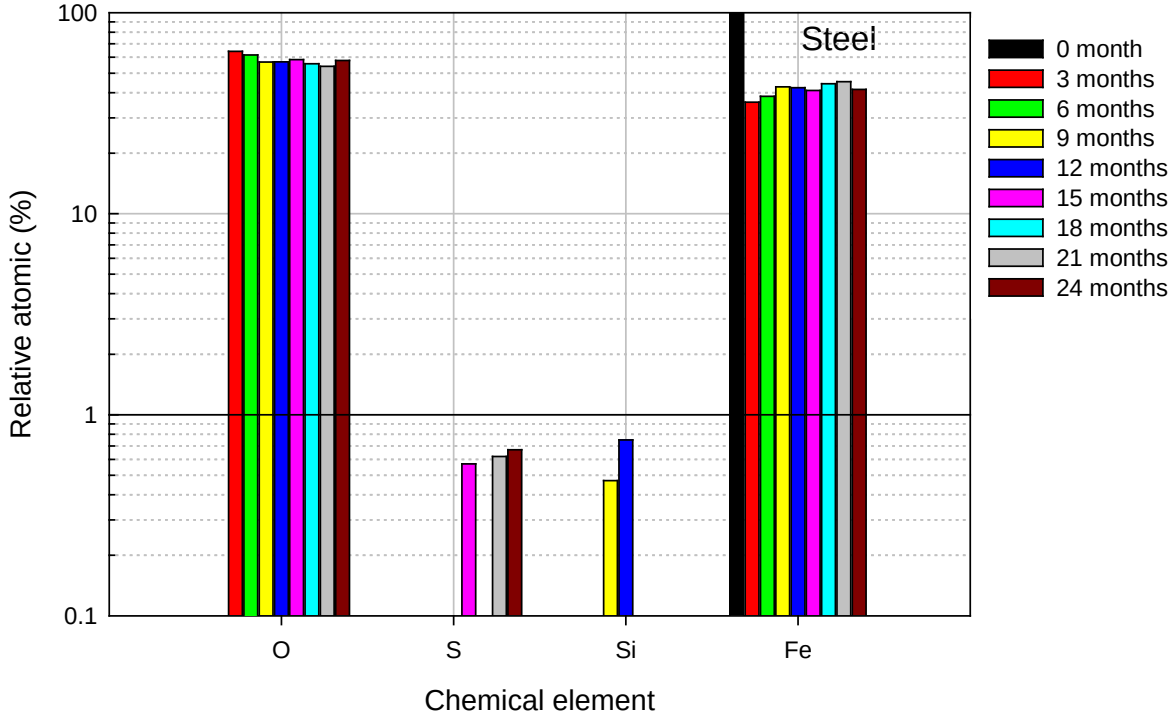


Figure J- 48. EDS of 1010 steel samples retrieved from Wright-Patterson AFB exposure site.

Distribution Statement A. Approved for Public Release.

Appendix K

Optical Images of Coated 1010 Steel and 2024-T3 Aluminum Substrates and Lap Joint Assemblies From Field Exposures After 1 and 2 Years.

Distribution Statement A. Approved for Public Release.

FIGURES

Page

Figure K-1. Summary table of coating systems and panel identification sequences 4

Figure K-2. Optical images of AA2024-T3 and 1010 Steel Coated Panels after 1 year exposure at Hickam AFB, HI.....5

Figure K-3. Optical images of AA2024-T3 and 1010 Steel Coated Panels after 1 year exposure at Kirtland AFB, NM.....6

Figure K-4. Optical images of AA2024-T3 and 1010 Steel Coated Panels after 1 year exposure at Daytona Beach, FL.....7

Figure K-5. Optical images of AA2024-T3 and 1010 Steel Coated Panels after 1 year exposure at Tyndall AFB, FL.....8

Figure K-6. Optical images of AA2024-T3 and 1010 Steel Coated Panels after 1 year exposure at Pt.Judith, RI.....9

Figure K-7. Optical images of AA2024-T3 and 1010 Steel Coated Panels after 1 year exposure on the East Coast ship 10

Figure K-8. Optical images of AA2024-T3 and 1010 Steel Coated Panels after 1 year exposure on the West Coast ship 11

Figure K-9. Optical images of AA2024-T3 and 1010 Steel Coated Panels after 1 year exposure at Wright-Patterson AFB, OH 12

Figure K-10. Optical images of disassembled AA2024-T3 lap joints coated with full chromate coating system after 1 year exposure on (Left) the East Coast ship and (Right) the West Coast ship ..13

Figure K-11. Optical images of disassembled AA2024-T3 lap joints coated with full chromate coating |system after 1 year exposure on (Top) Hickam AFB, HI and (Bottom) Daytona Beach, FL ..14

Figure K-12. Optical images of disassembled AA2024-T3 lap joints coated with full chromate coating system after 1 year exposure on (Top) Tyndall AFB, FL and (Bottom) Kirtland AFB, NM 15

Figure K-13. Optical images of disassembled AA2024-T3 lap joints coated with full chromate coating system after 1 year exposure on (Top) Pt. Judith, RI and (Bottom) Wright-Patterson AFB, OH 16

Figure K-14. Optical images of AA2024-T3 and 1010 Steel Coated Panels after 2 year exposure on the East Coast ship 17

Figure K-15. Optical images of AA2024-T3 and 1010 Steel Coated Panels after 2 year exposure on the West Coast ship 18

Figure K-16. Optical images of AA2024-T3 and 1010 Steel Coated Panels after 2 year exposure at Kirtland AFB, NM.....19

Figure K-17. Optical images of AA2024-T3 and 1010 Steel Coated Panels after 2 year exposure at Tyndall AFB, FL.....20

Figure K-18. Optical images of AA2024-T3 and 1010 Steel Coated Panels after 2 year exposure at Hickam AFB, HI.....21

Distribution Statement A. Approved for Public Release.

FIGURES (Continued)

Page

Figure K-19. Optical images of AA2024-T3 and 1010 Steel Coated Panels after 2 year exposure at Daytona Beach, FL 22

Figure K-20. Optical images of AA2024-T3 and 1010 Steel Coated Panels after 2 year exposure at Pt. Judith, RI 23

Figure K-21. Optical images of disassembled AA2024-T3 lap joints coated with full chromate coating system after 2 year exposure on (Left) the East Coast ship and (Right) the West Coast ship 24

Figure K-22. Optical images of disassembled AA2024-T3 lap joints coated with full chromate coating system after 2 years exposure on (Top) Hickam AFB, HI and (Bottom) Daytona Beach, FL 25

Figure K-23. Optical images of disassembled AA2024-T3 lap joints coated with full chromate coating system after 2 years exposure on (Top) Tyndall AFB, FL and (Bottom) Kirtland AFB, NM 26

Figure K-24. Optical images of disassembled AA2024-T3 lap joints coated with full chromate coating system after 2 years exposure at Pt. Judith, RI 27

Distribution Statement A. Approved for Public Release.

System	Substrate / Code	Pre Clean	Clean/Wash	De-Ox	Conversion Coat	Primer 0.6 - 0.9 Mils	Topcoat 1.7 - 2.3 Mils	Panel ID #s (12"x12" 8UP)
A	2024-T3 Bare .032"	Standard CTIO Prep			Alodine 1600	Deft 02-Y-40	Deft 99-GY-001	971-A1A-001 .. 040
B	1010 Steel 0.030"	Solvent Wipe and Alkaline Clean			None	MIL-PRF-26915 Zinc Rich Primer		971-F1B-001 .. 040
C	2024-T3 Bare .063" Lap Joints assembled with Hy-Loks	Standard CTIO Prep			Alodine 1600	Deft 02-Y-40		971-A1C001 .. 144 **12up .. 3x4s before assembly**
D	1010 Steel 0.030"	Standard CTIO Prep				Deft 02-Y-40		971-F1D-001 .. 040
E	2024-T3 Bare .032"					Deft 02-GN-084		971-A1E-001 .. 040
F	2024-T3 Bare .032"				Alodine 5200	SICO 577-630 or alternate product	Akzo Nobel Aerodur 5000	971-A1F-001 .. 040
G	2024-T3 Bare .032"	Prekote				Akzo Nobel 2100 Mg-Rich 1.0-1.4 mils		971-A1G-001 .. 040
H	1010 Steel 0.030"							971-F1H-001 .. 040
I	2024-T3 Bare .032"					Negative Primer	Deft 99-GY-001	971-A1I-001 .. 040
J	1010 Steel 0.030"							971-F1J-001 .. 040

Figure K-1. Summary table of coating systems and panel identification sequences.

Distribution Statement A. Approved for Public Release.

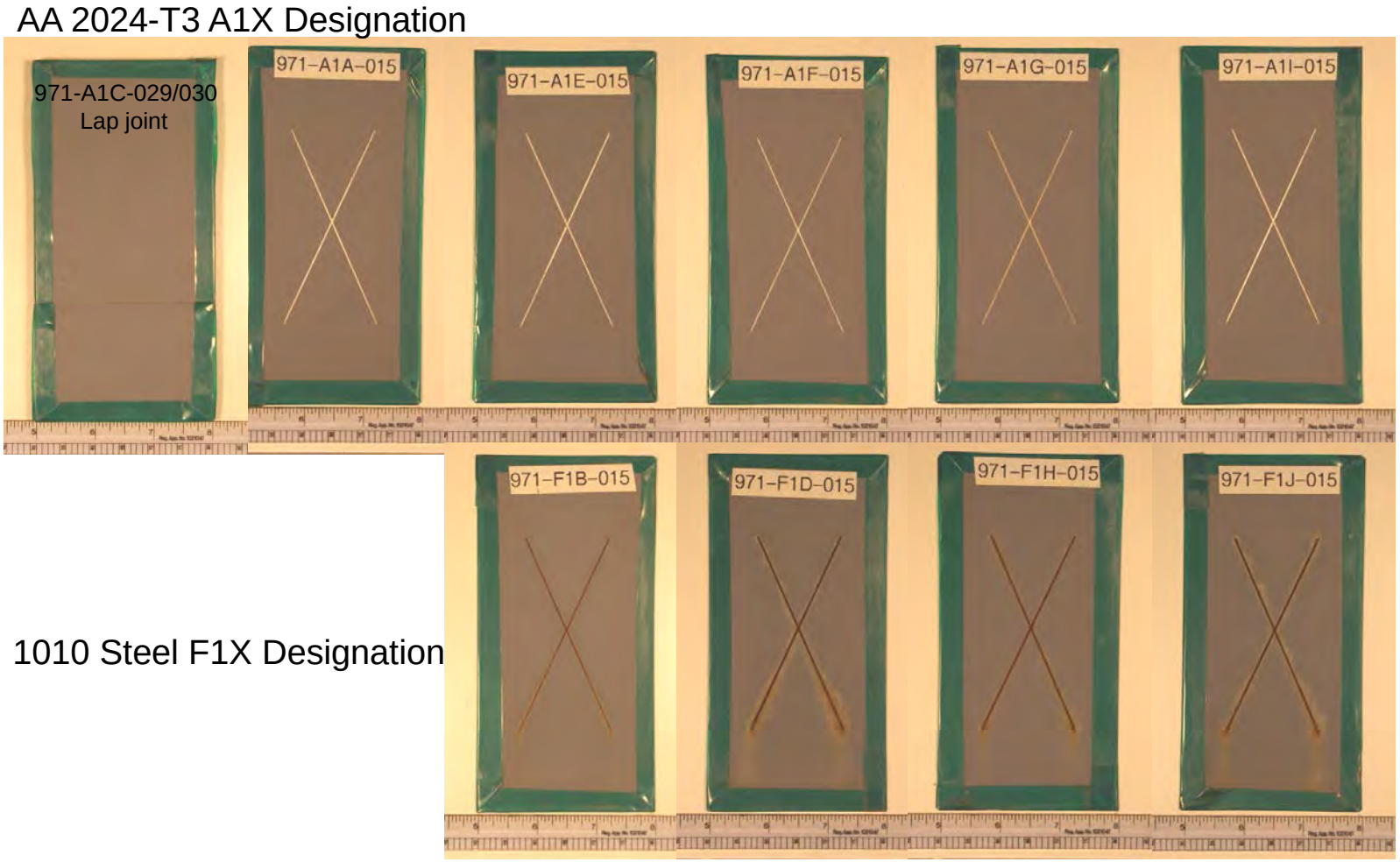
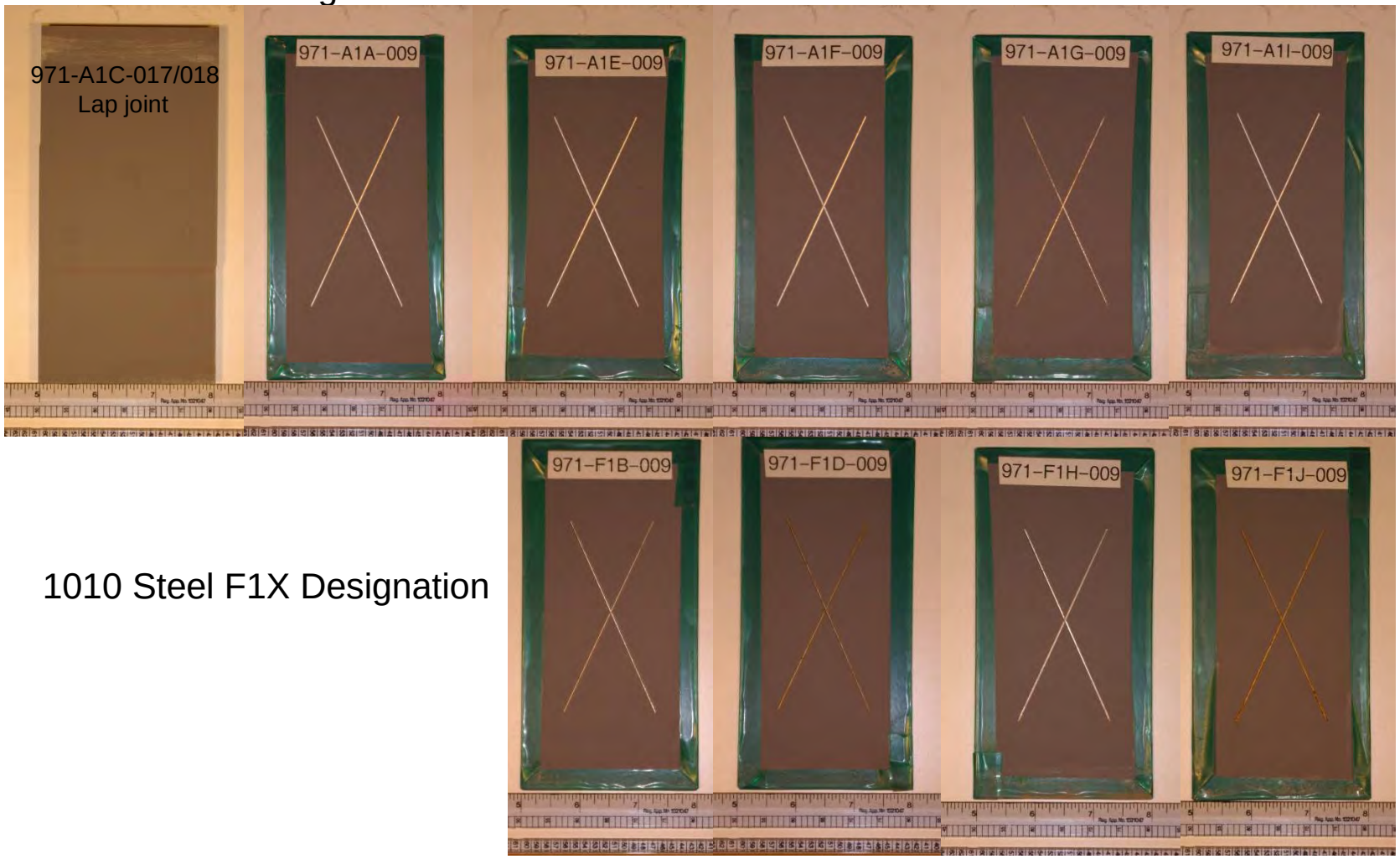


Figure K - 2. Optical images of AA2024-T3 and 1010 Steel Coated Panels after 1 year exposure at Hickam AFB, HI.

Distribution Statement A. Approved for Public Release.

AA 2024-T3 A1X Designation

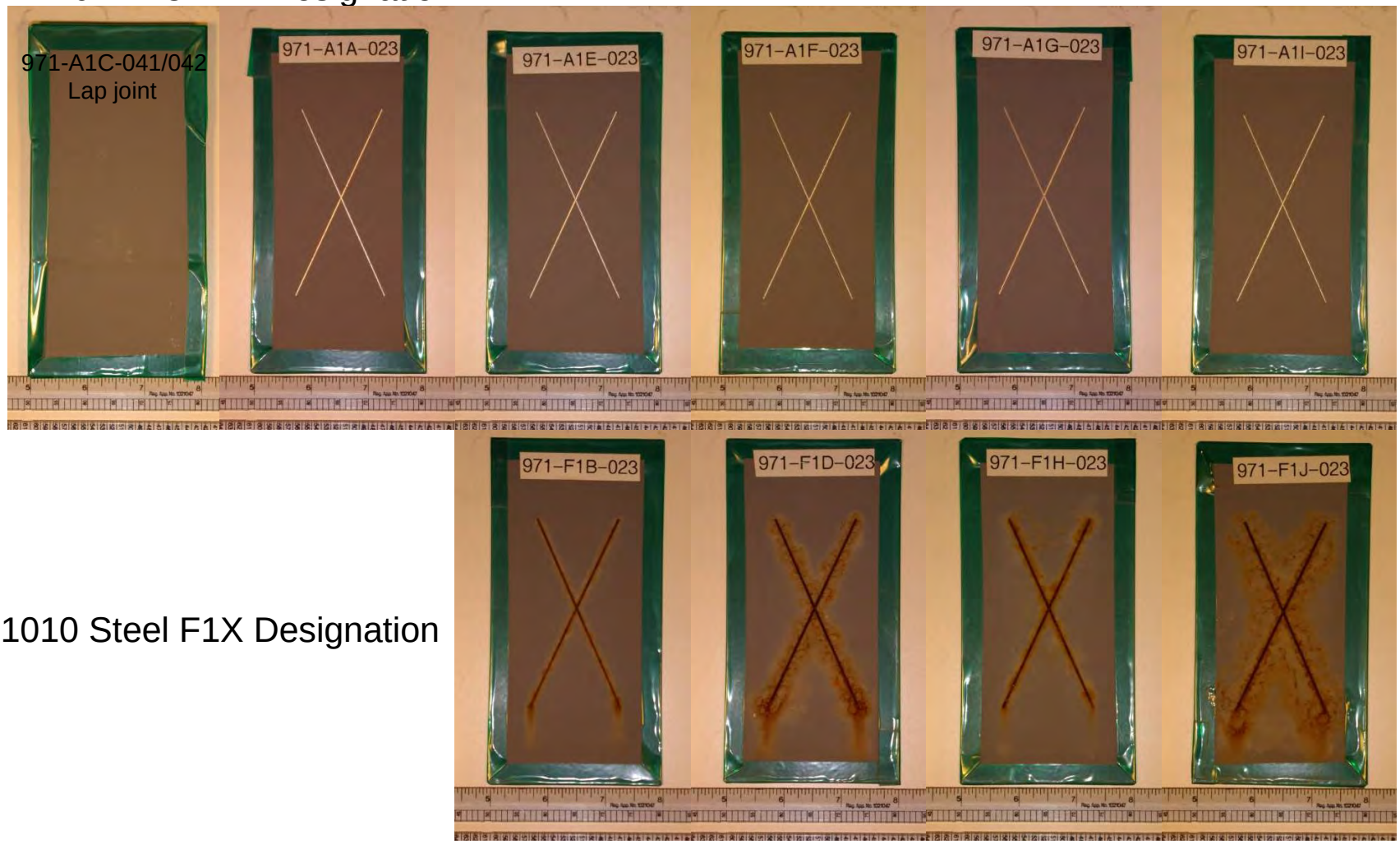


1010 Steel F1X Designation

Figure K - 3. Optical images of AA2024-T3 and 1010 Steel Coated Panels after 1 year exposure at Kirtland AFB, NM.

Distribution Statement A. Approved for Public Release.

AA 2024-T3 A1X Designation

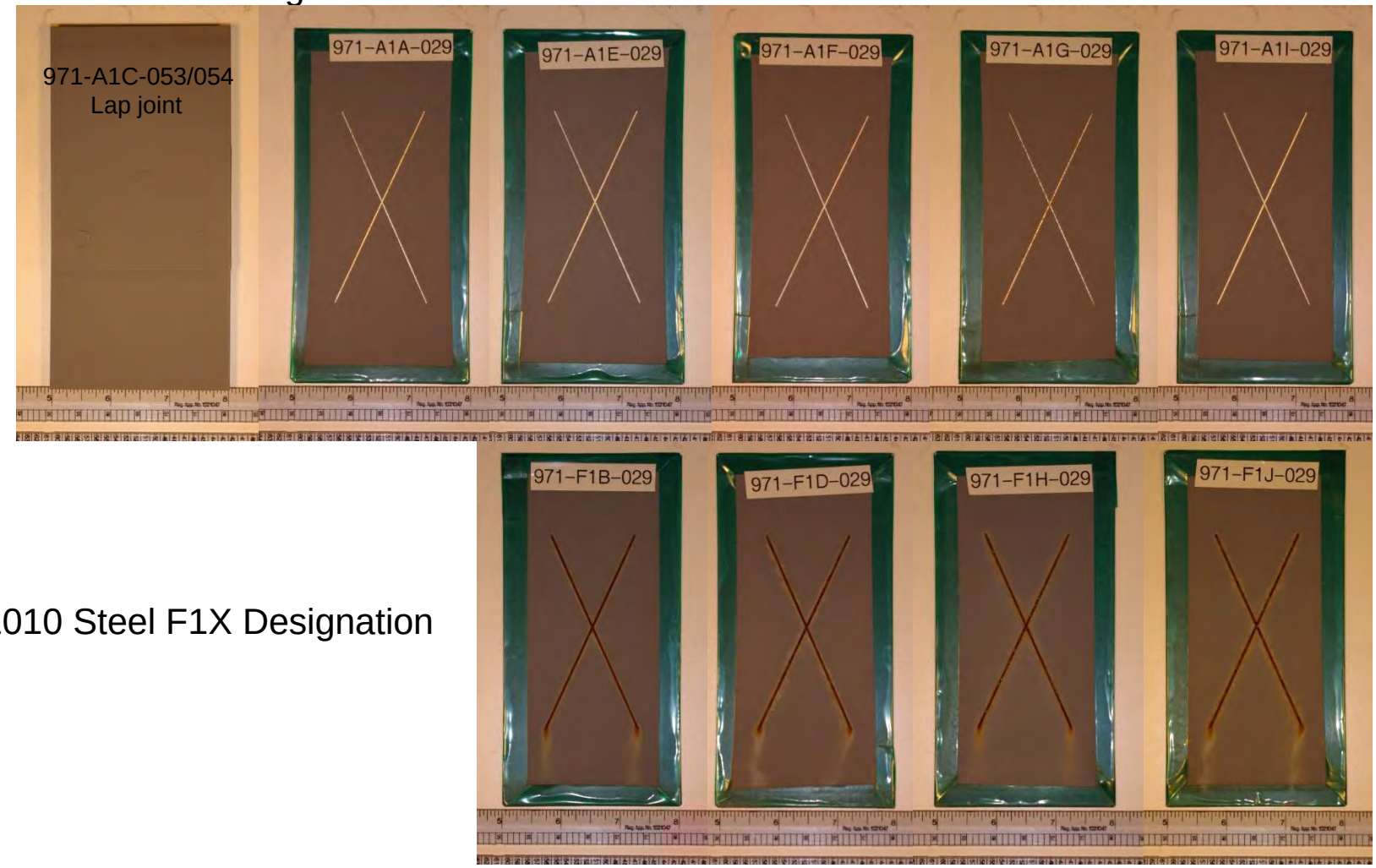


1010 Steel F1X Designation

Figure K - 4. Optical images of AA2024-T3 and 1010 Steel Coated Panels after 1 year exposure at Daytona Beach, FL.

Distribution Statement A. Approved for Public Release.

AA 2024-T3 A1X Designation

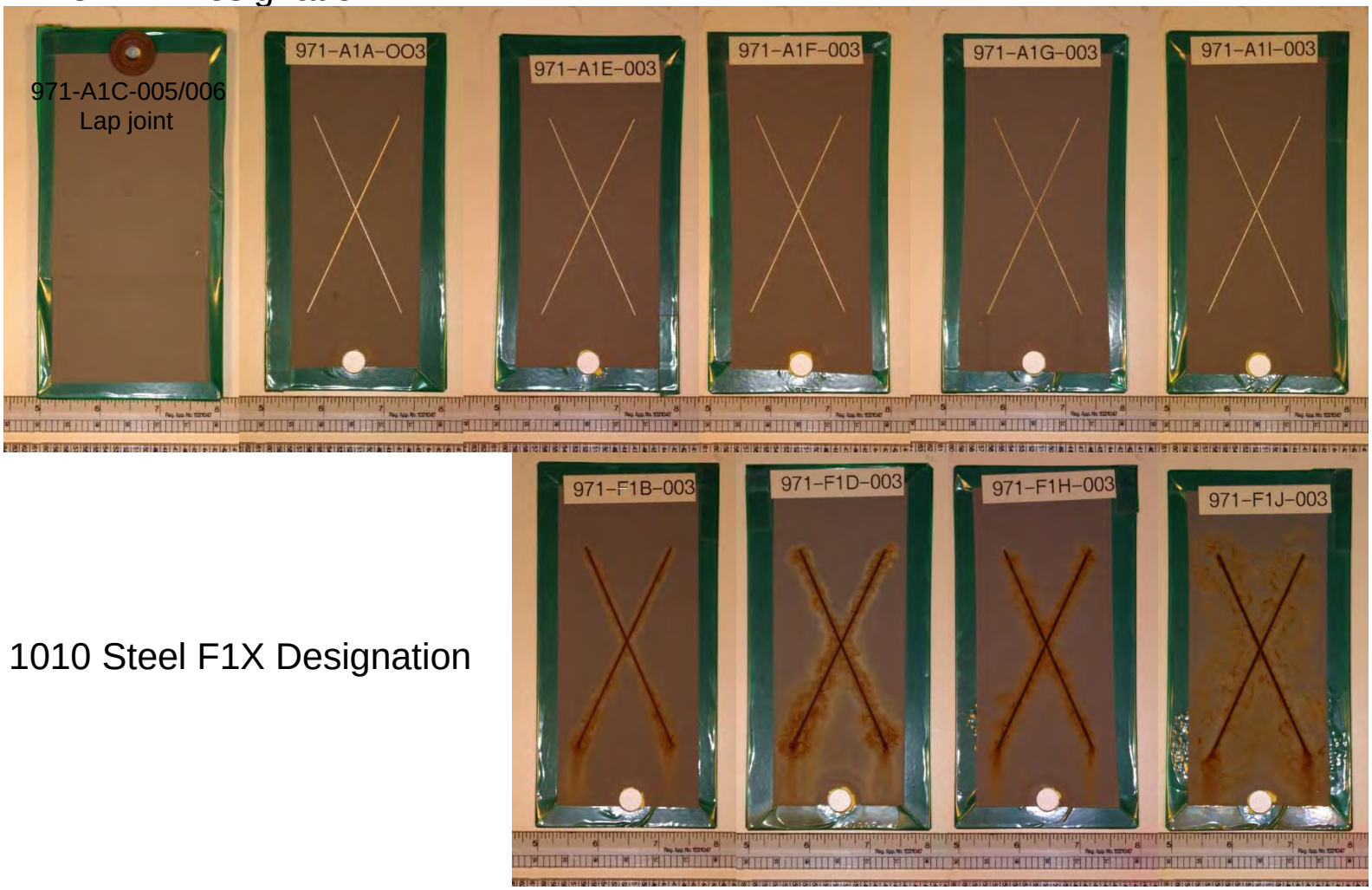


1010 Steel F1X Designation

Figure K - 5. Optical images of AA2024-T3 and 1010 Steel Coated Panels after 1 year exposure at Tyndall AFB, FL.

Distribution Statement A. Approved for Public Release.

AA 2024-T3 A1X Designation

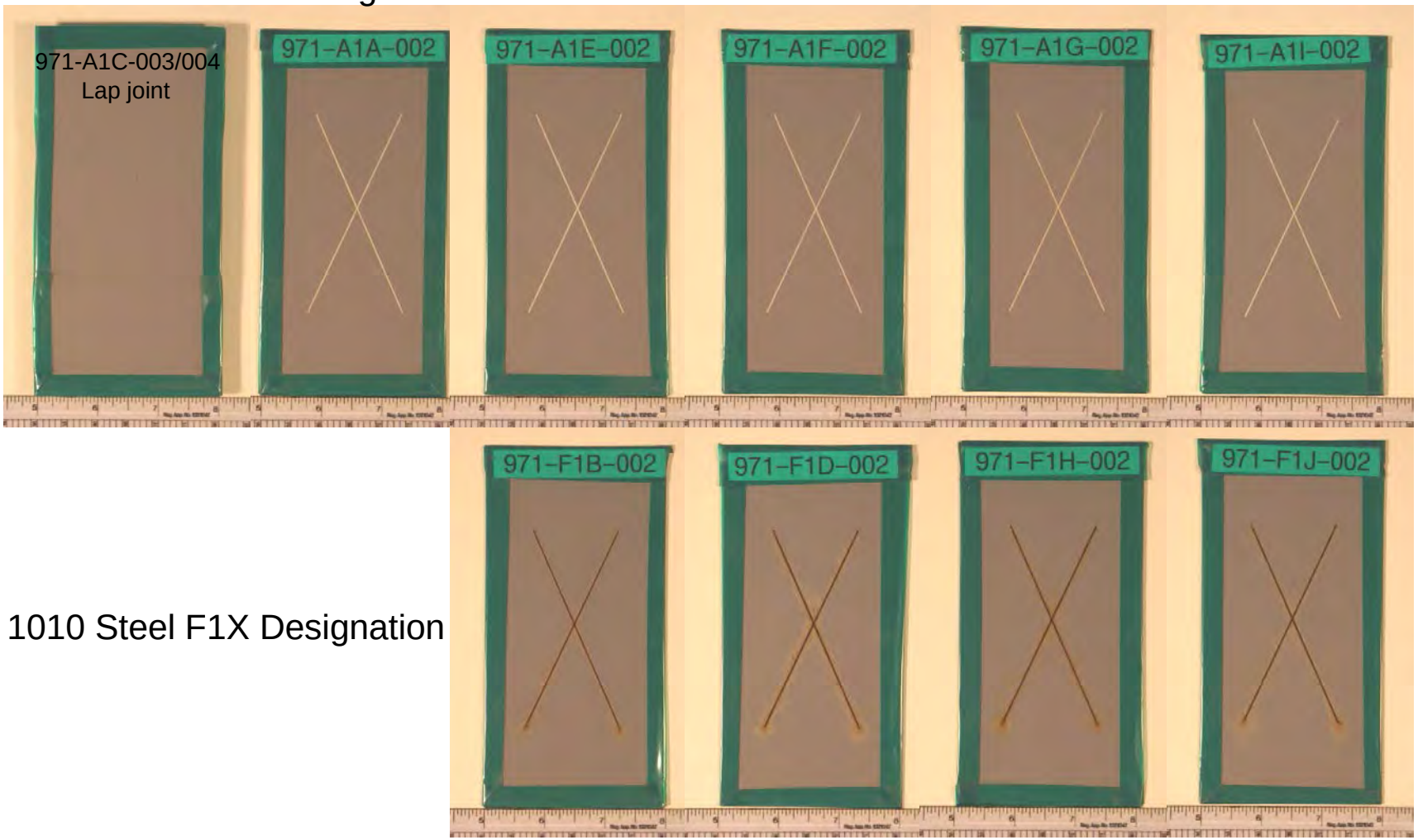


1010 Steel F1X Designation

Figure K - 6. Optical images of AA2024-T3 and 1010 Steel Coated Panels after 1 year exposure at Pt. Judith, RI.

Distribution Statement A. Approved for Public Release.

AA 2024-T3 A1X Designation

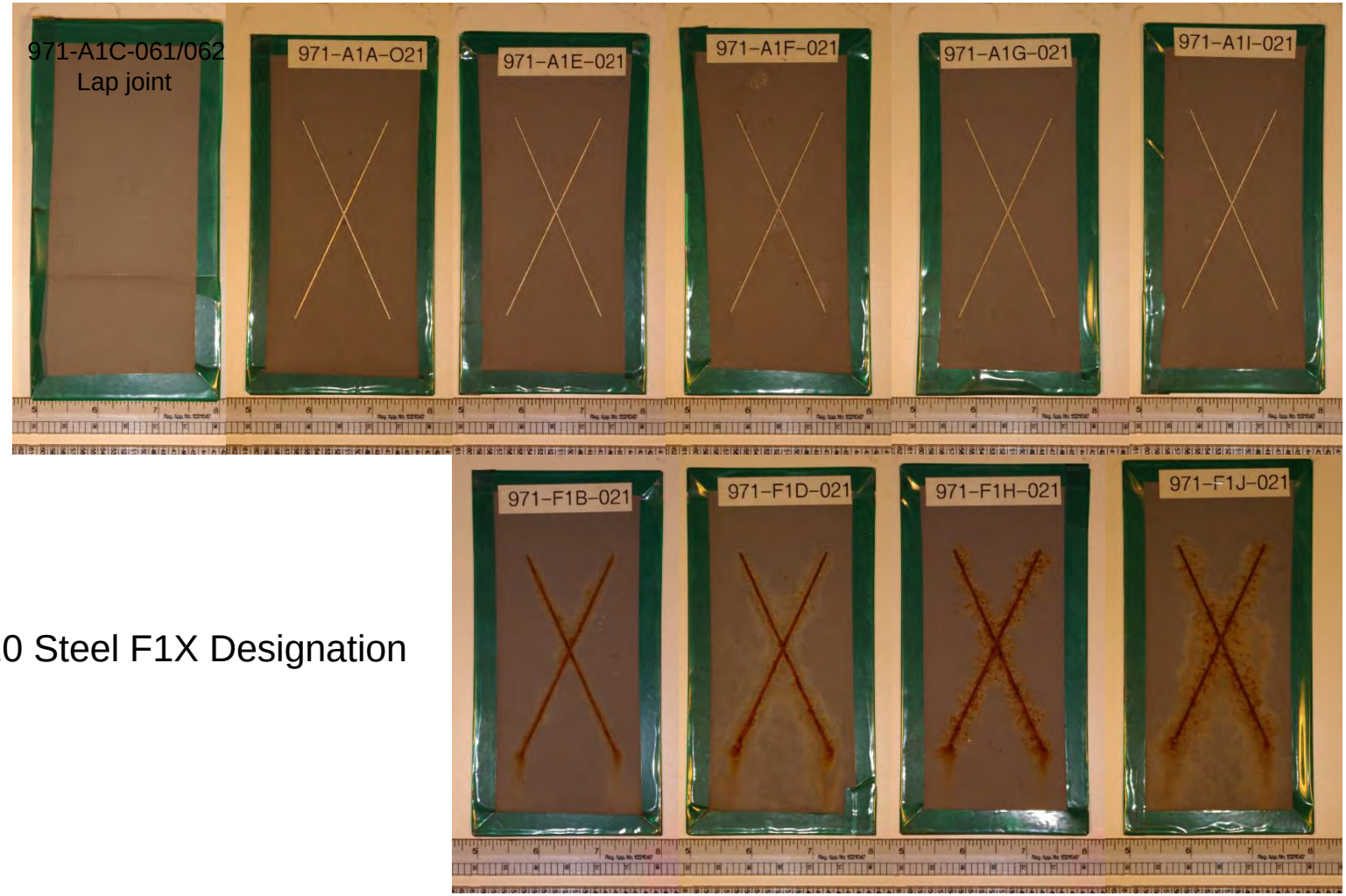


1010 Steel F1X Designation

Figure K - 7. Optical images of AA2024-T3 and 1010 Steel Coated Panels after 1 year exposure on the East Coast ship.

Distribution Statement A. Approved for Public Release.

AA 2024-T3 A1X Designation

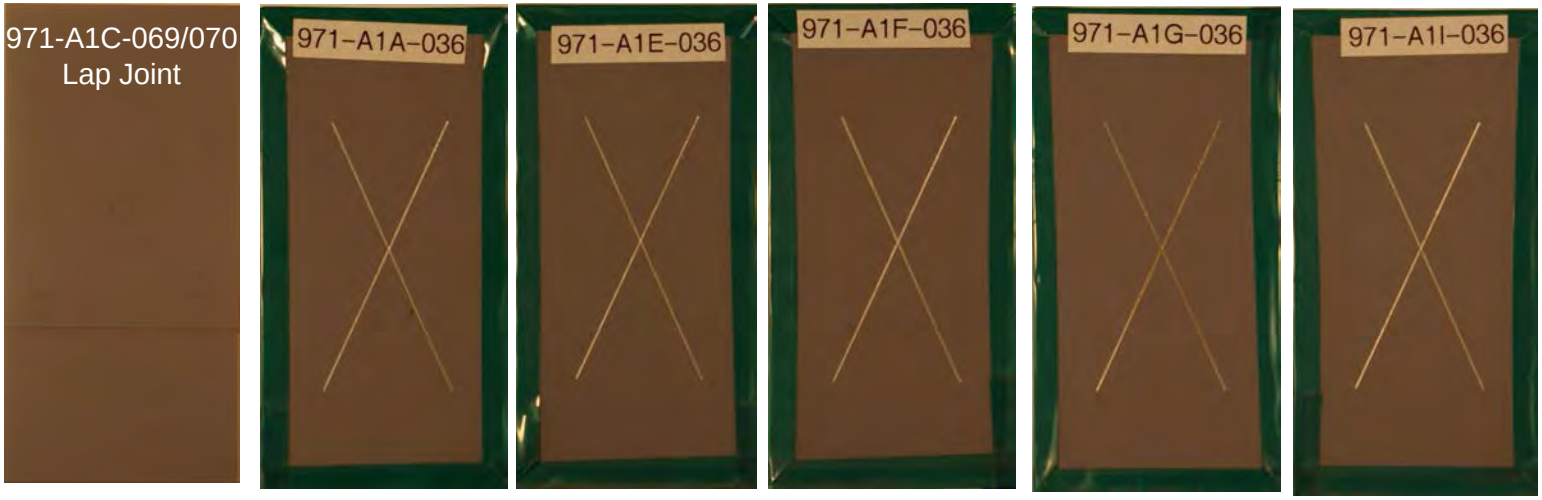


1010 Steel F1X Designation

Figure K - 8. Optical images of AA2024-T3 and 1010 Steel Coated Panels after 1 year exposure on the West Coast ship.

Distribution Statement A. Approved for Public Release.

AA 2024-T3 A1X Designation



1010 Steel F1X Designation

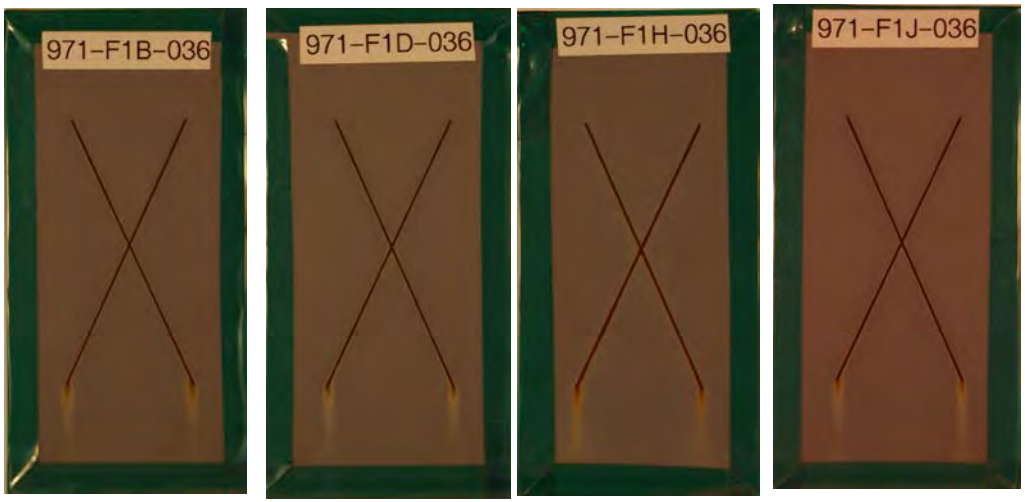
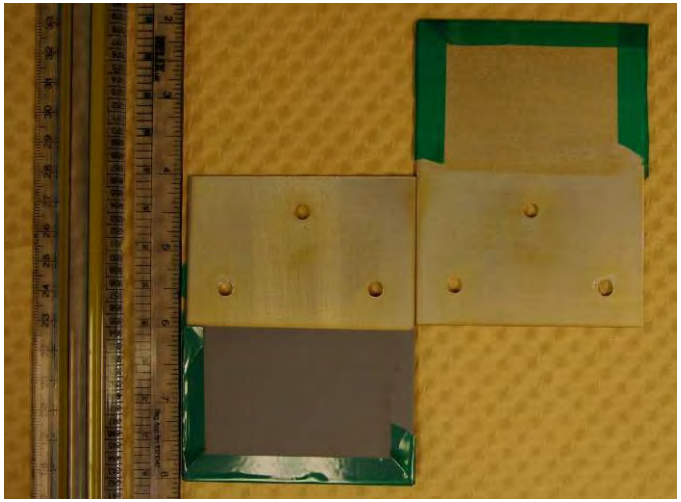


Figure K - 9. Optical images of AA2024-T3 and 1010 Steel Coated Panels after 1 year exposure at Wright-Patterson AFB, OH.

Distribution Statement A. Approved for Public Release.

971-A1C-003/004



971-A1C-061/062

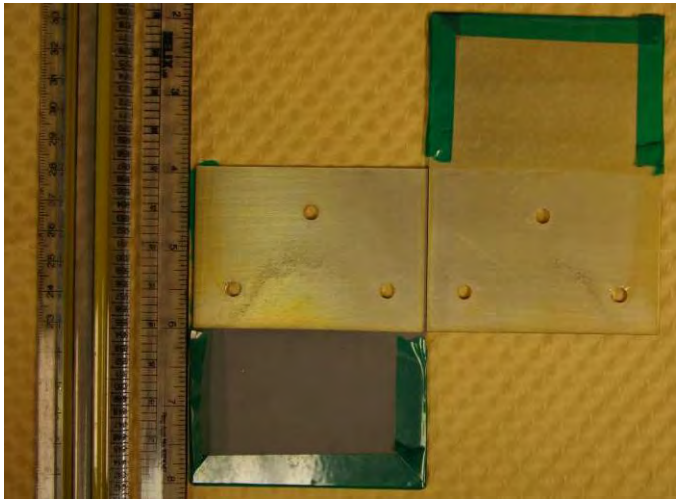
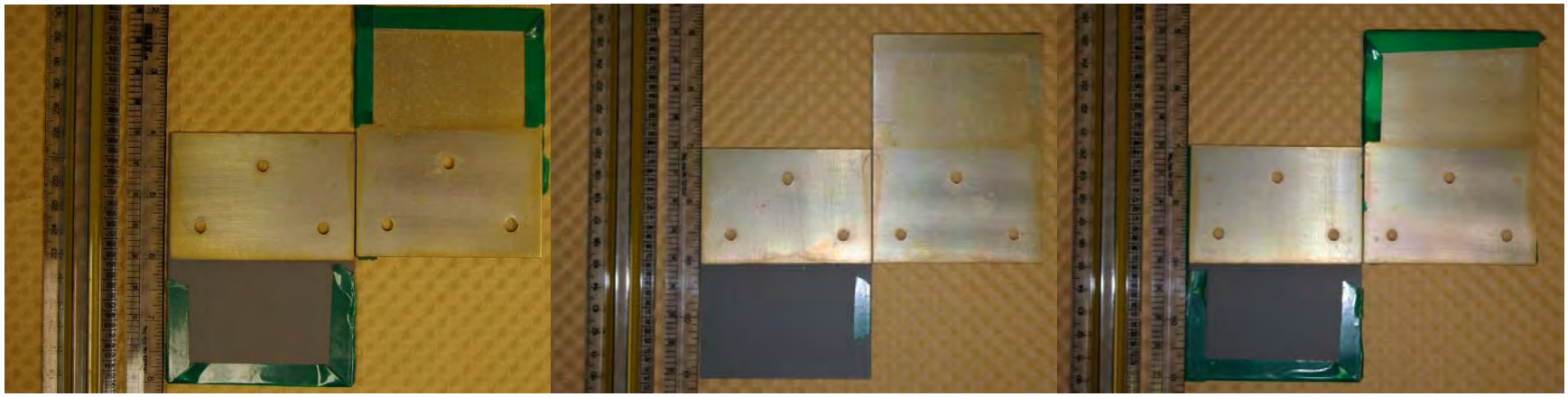


Figure K - 10. Optical images of disassembled AA2024-T3 lap joints coated with full chromate coating system after 1 year exposure on (Left) the East Coast ship and (Right) the West Coast ship.

Distribution Statement A. Approved for Public Release.

971-A1C-029/030 971-A1C-031/032 971-A1C-033/034



971-A1C-041/042 971-A1C-043/044 971-A1C-045/046

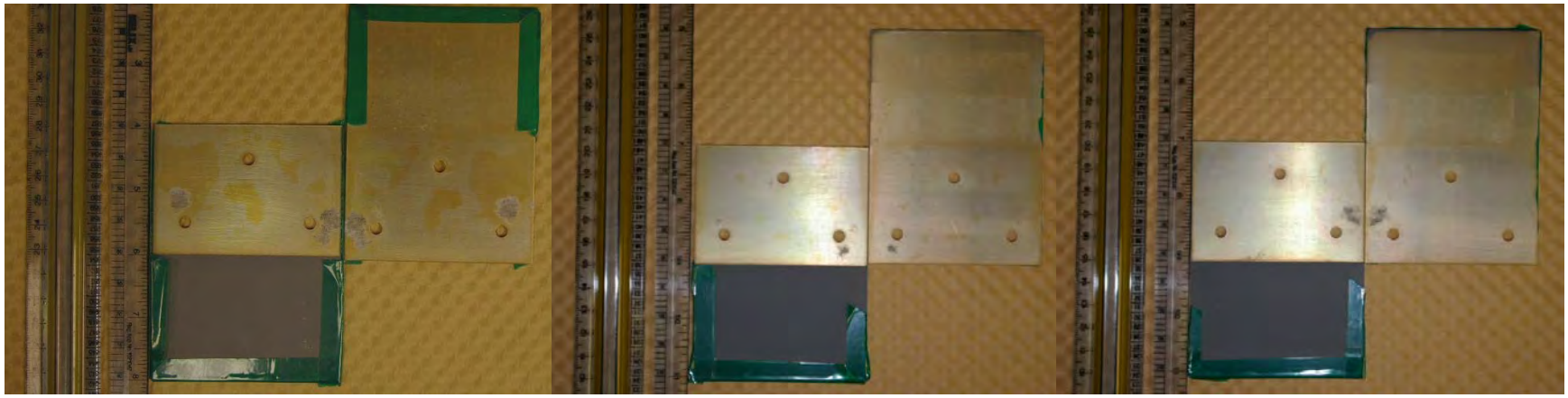
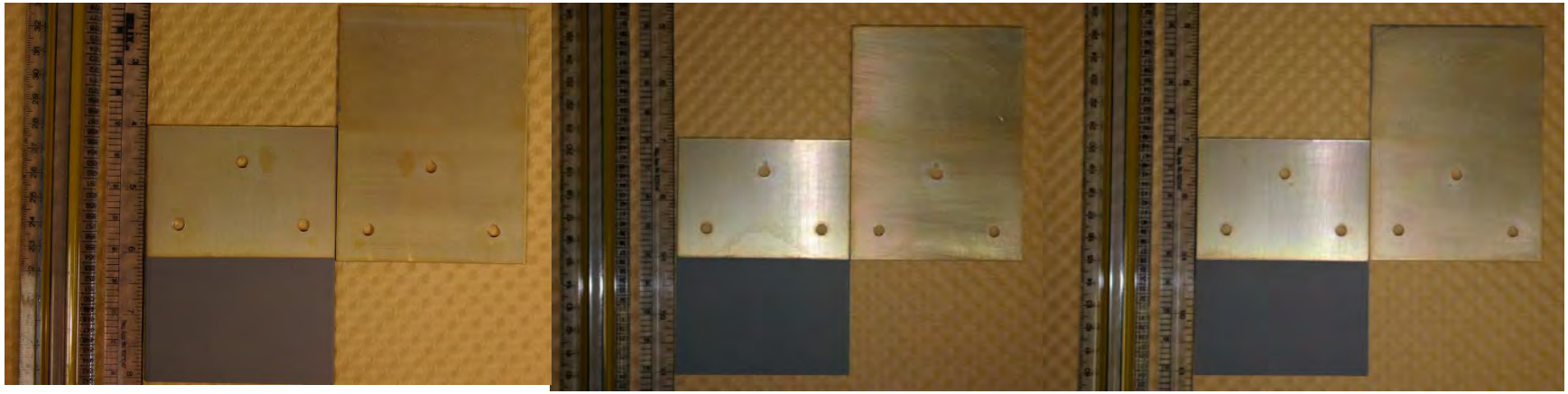


Figure K - 11. Optical images of disassembled AA2024-T3 lap joints coated with full chromate coating system after 1 year exposure on (Top) Hickam AFB, HI and (Bottom) Daytona Beach, FL.

Distribution Statement A. Approved for Public Release.

971-A1C-053/054 971-A1C-057/058 971-A1C-065/066



971-A1C-017/018 971-A1C-019/020 971-A1C-021/022

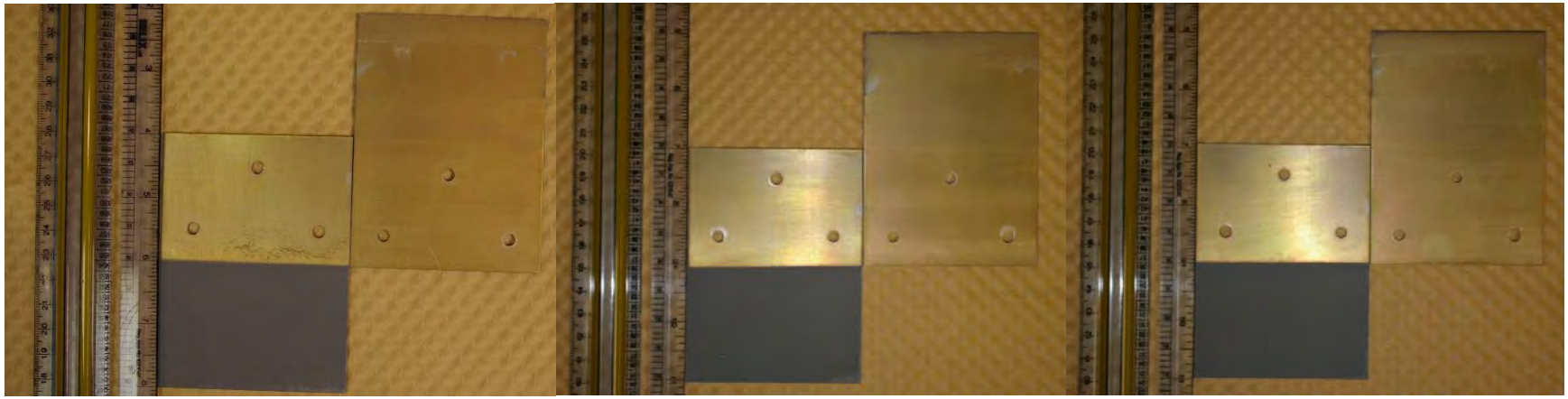
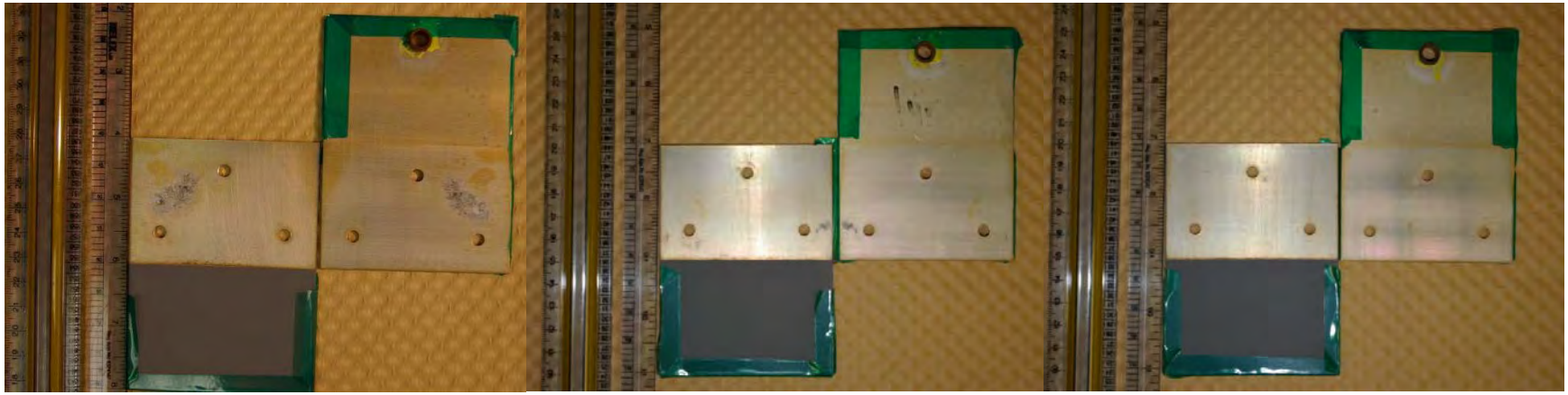


Figure K - 12. Optical images of disassembled AA2024-T3 lap joints coated with full chromate coating system after 1 year exposure on (Top) Tyndall AFB, FL and (Bottom) Kirtland AFB, NM.

Distribution Statement A. Approved for Public Release.

971-A1C-005/006 971-A1C-007/008 971-A1C-009/010



971-A1C-069/070 971-A1C-071/072 971-A1C-073/074

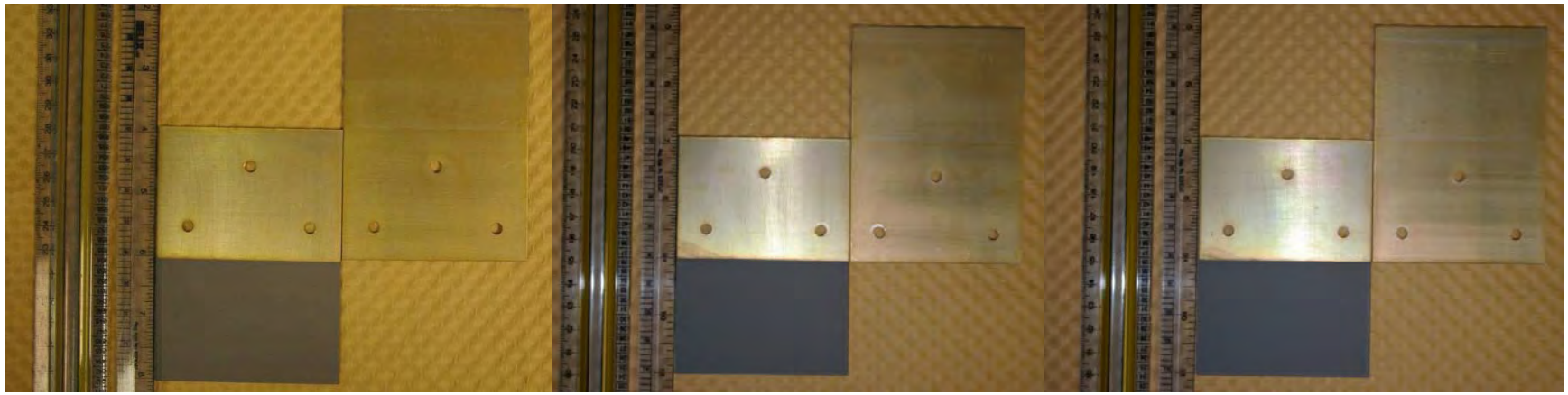
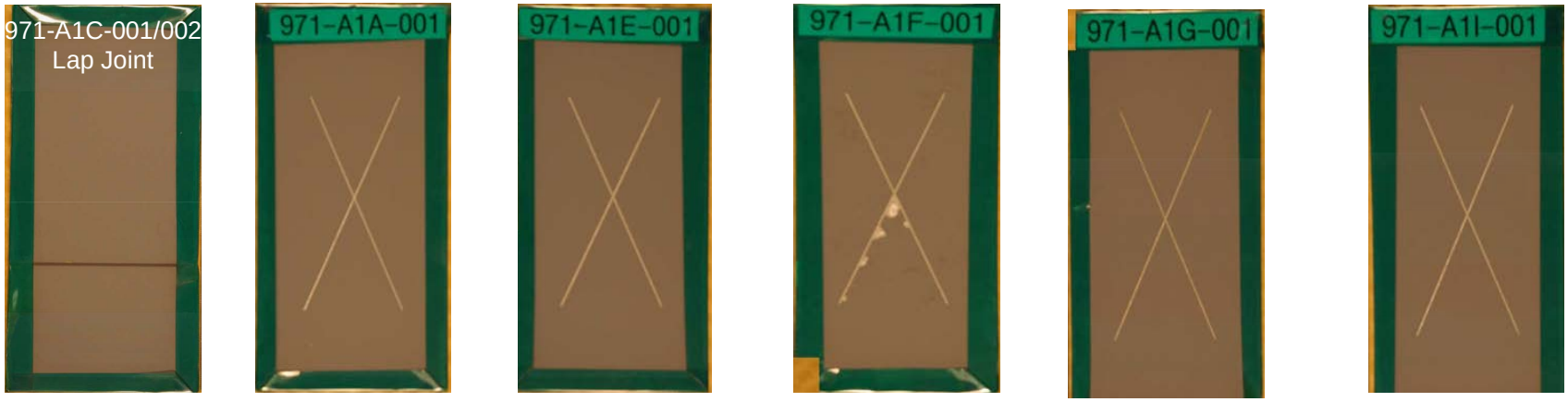


Figure K - 13. Optical images of disassembled AA2024-T3 lap joints coated with full chromate coating system after 1 year exposure on (Top) Pt. Judith, RI and (Bottom) Wright-Patterson AFB, OH.

Distribution Statement A. Approved for Public Release.

AA 2024-T3 A1X Designation



1010 Steel F1X Designation

Figure K - 14. Optical images of AA2024-T3 and 1010 Steel Coated Panels after 2 year exposure on the East Coast ship.

Distribution Statement A. Approved for Public Release.

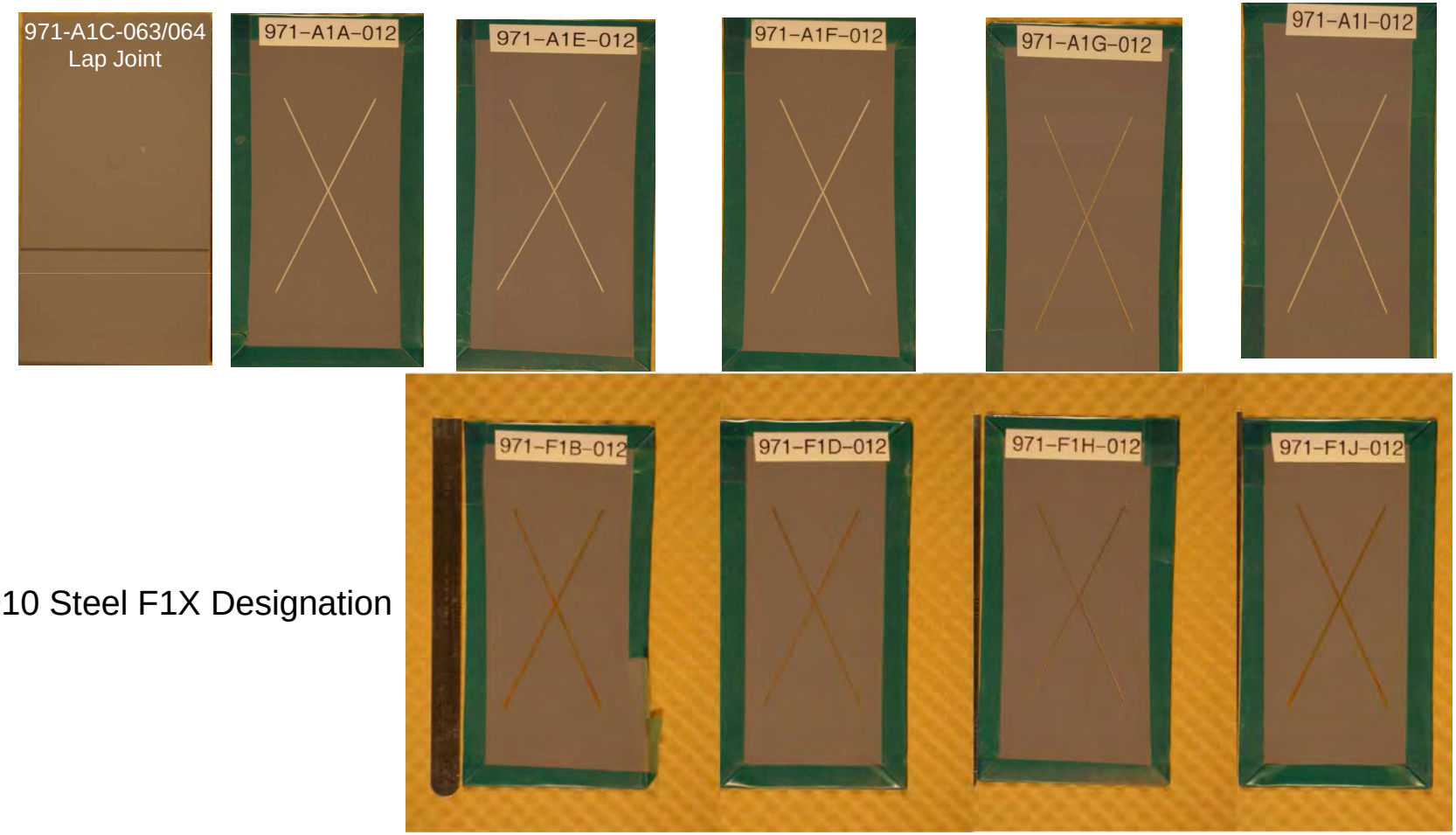
AA 2024-T3 A1X Designation

1010 Steel F1X Designation

Figure K - 15. Optical images of AA2024-T3 and 1010 Steel Coated Panels after 2 year exposure on the West Coast ship.

Distribution Statement A. Approved for Public Release.

AA 2024-T3 A1X Designation

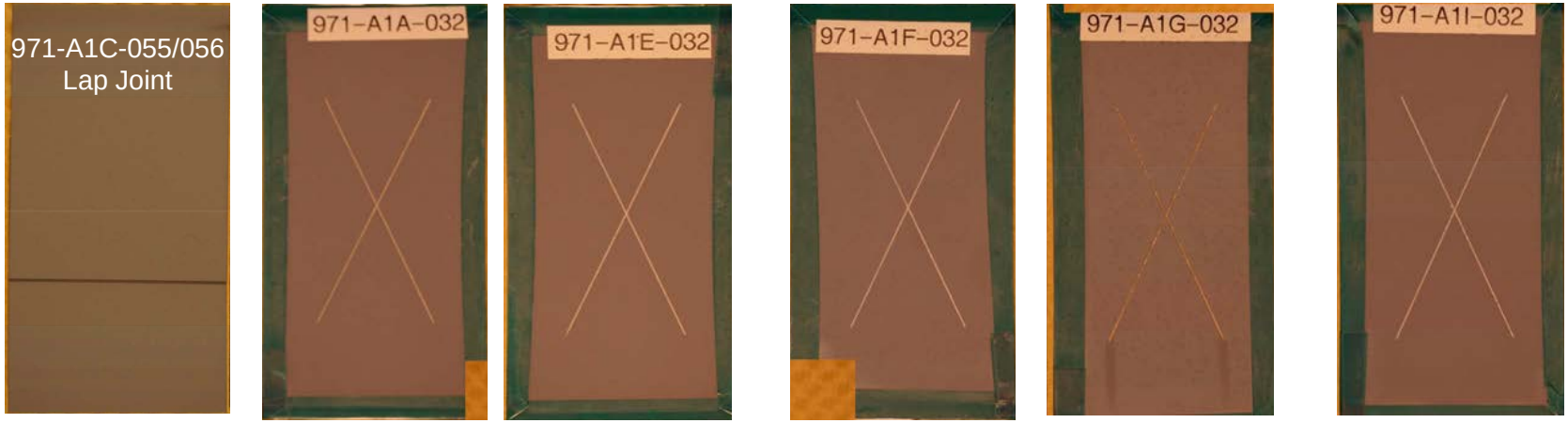


1010 Steel F1X Designation

Figure K - 16. Optical images of AA2024-T3 and 1010 Steel Coated Panels after 2 year exposure at Kirtland AFB, NM.

Distribution Statement A. Approved for Public Release.

AA 2024-T3 A1X Designation



1010 Steel F1X Designation

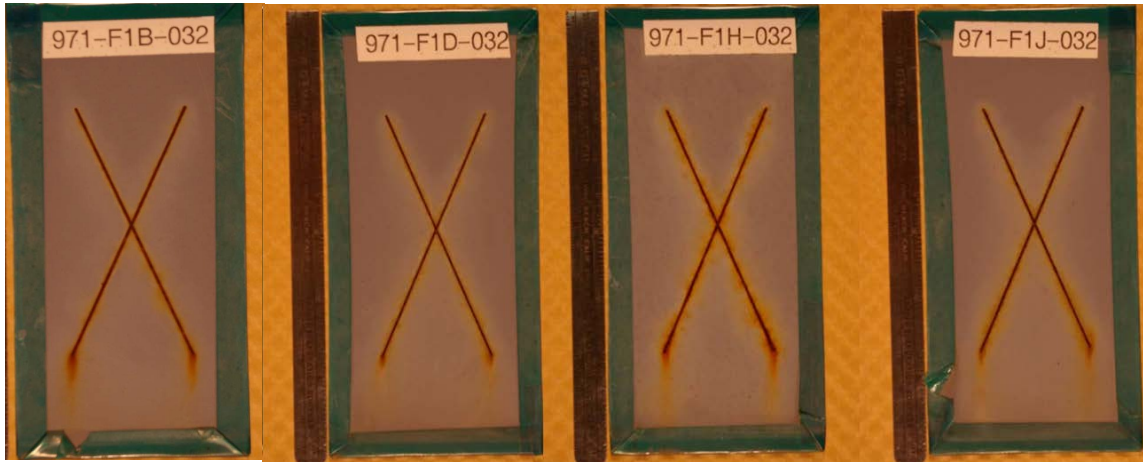


Figure K - 17. Optical images of AA2024-T3 and 1010 Steel Coated Panels after 2 year exposure at Tyndall AFB, FL.

Distribution Statement A. Approved for Public Release.

AA 2024-T3 A1X Designation

1010 Steel F1X Designation

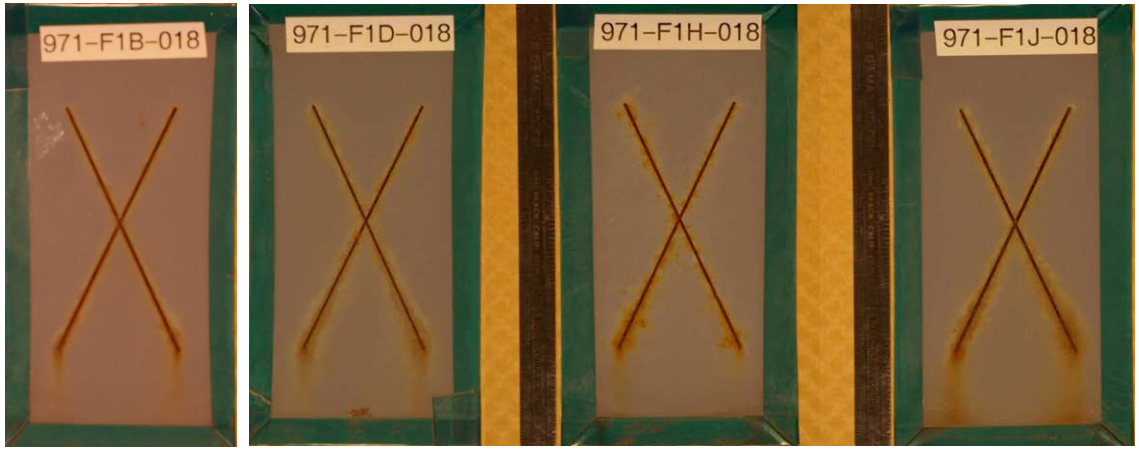


Figure K - 18. Optical images of AA2024-T3 and 1010 Steel Coated Panels after 2 year exposure at Hickam AFB, HI.

Distribution Statement A. Approved for Public Release.

AA 2024-T3 A1X Designation

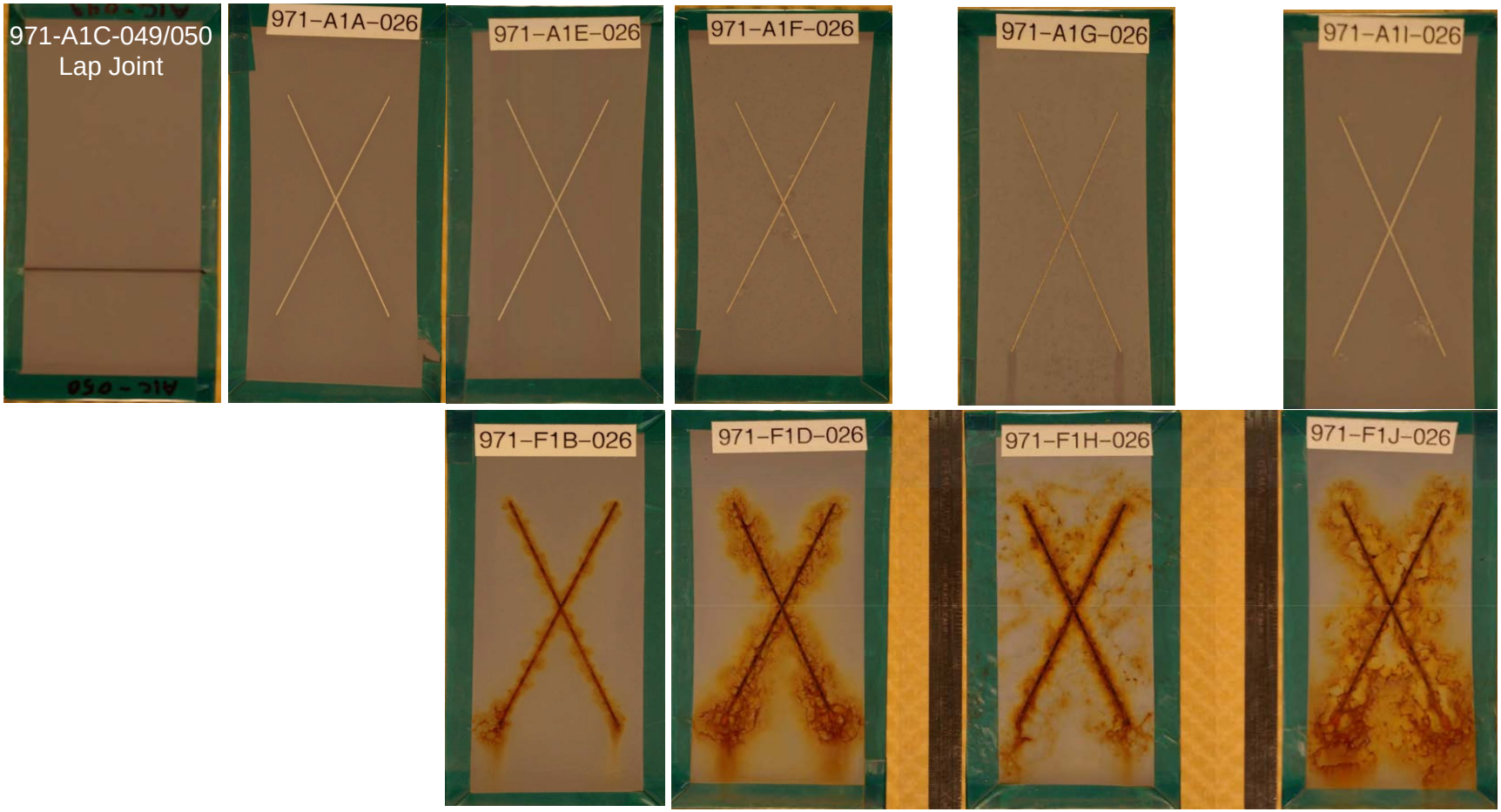
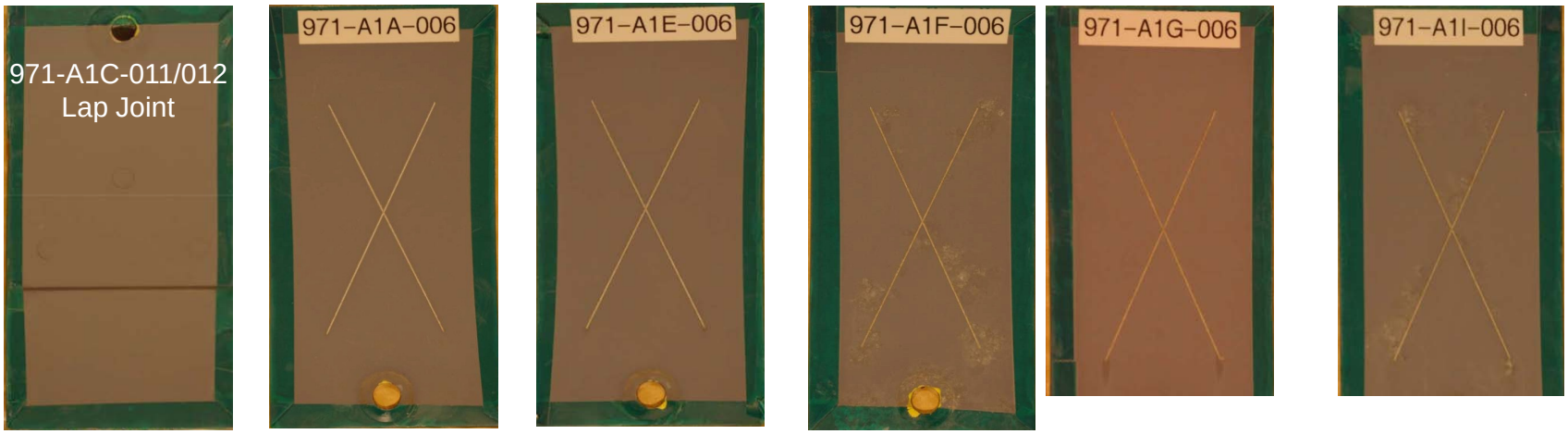


Figure K - 19. Optical images of AA2024-T3 and 1010 Steel Coated Panels after 2 year exposure at Daytona Beach, FL.

Distribution Statement A. Approved for Public Release.

AA 2024-T3 A1X Designation

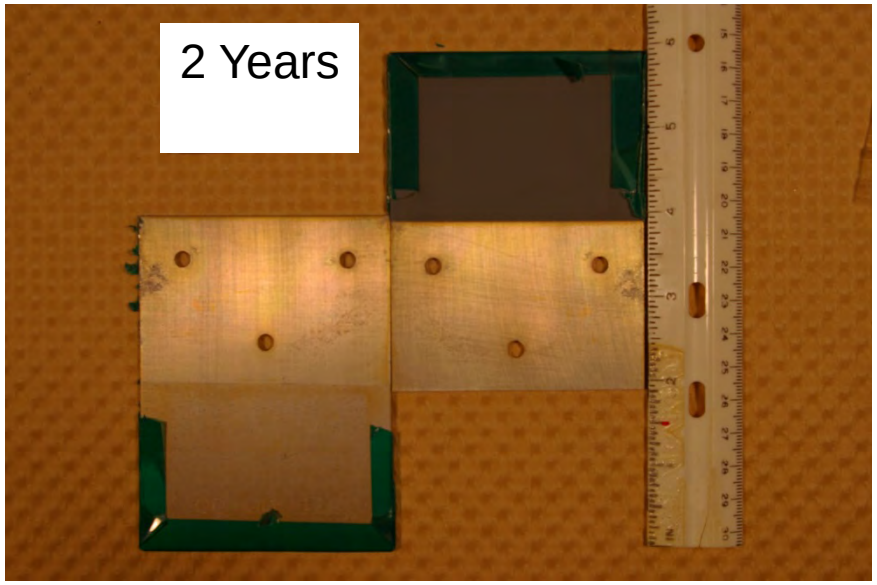


1010 Steel F1X Designation

Figure K - 20. Optical images of AA2024-T3 and 1010 Steel Coated Panels after 2 year exposure at Pt. Judith, RI.

Distribution Statement A. Approved for Public Release.

971-A1C-001/002



971-A1C-063/064

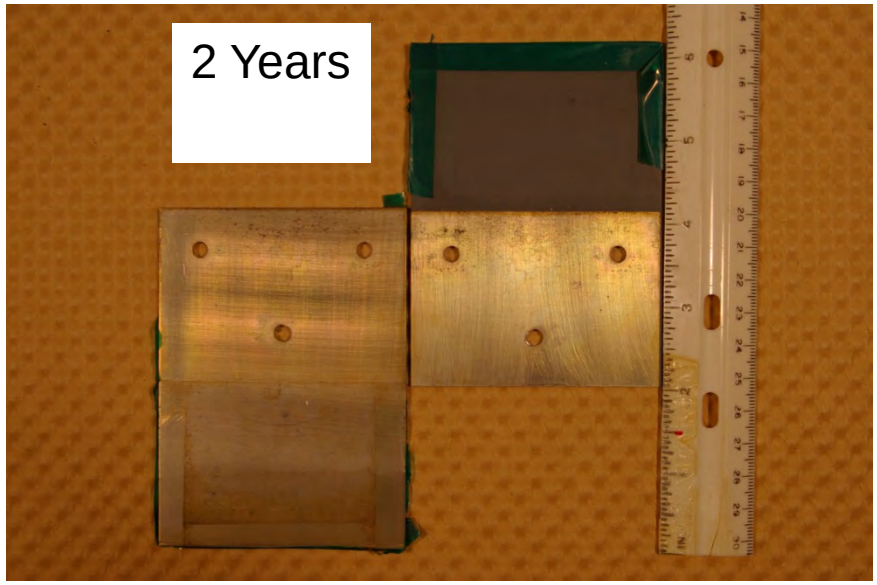


Figure K - 21. Optical images of disassembled AA2024-T3 lap joints coated with full chromate coating system after 2 year exposure on (Left) the East Coast ship and (Right) the West Coast ship.

Distribution Statement A. Approved for Public Release.

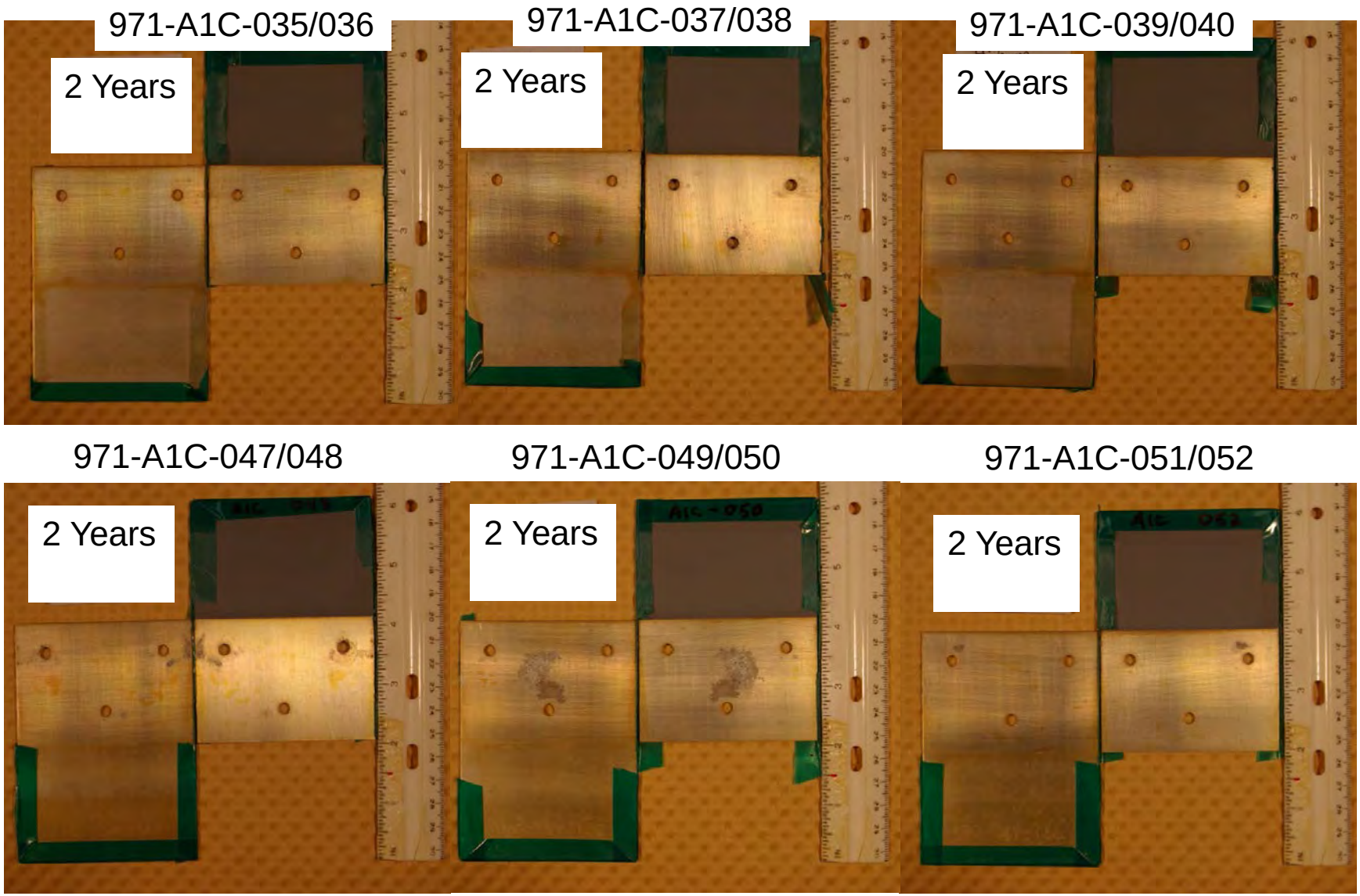


Figure K - 22. Optical images of disassembled AA2024-T3 lap joints coated with full chromate coating system after 2 years exposure on (Top) Hickam AFB, HI and (Bottom) Daytona Beach, FL.

Distribution Statement A. Approved for Public Release.

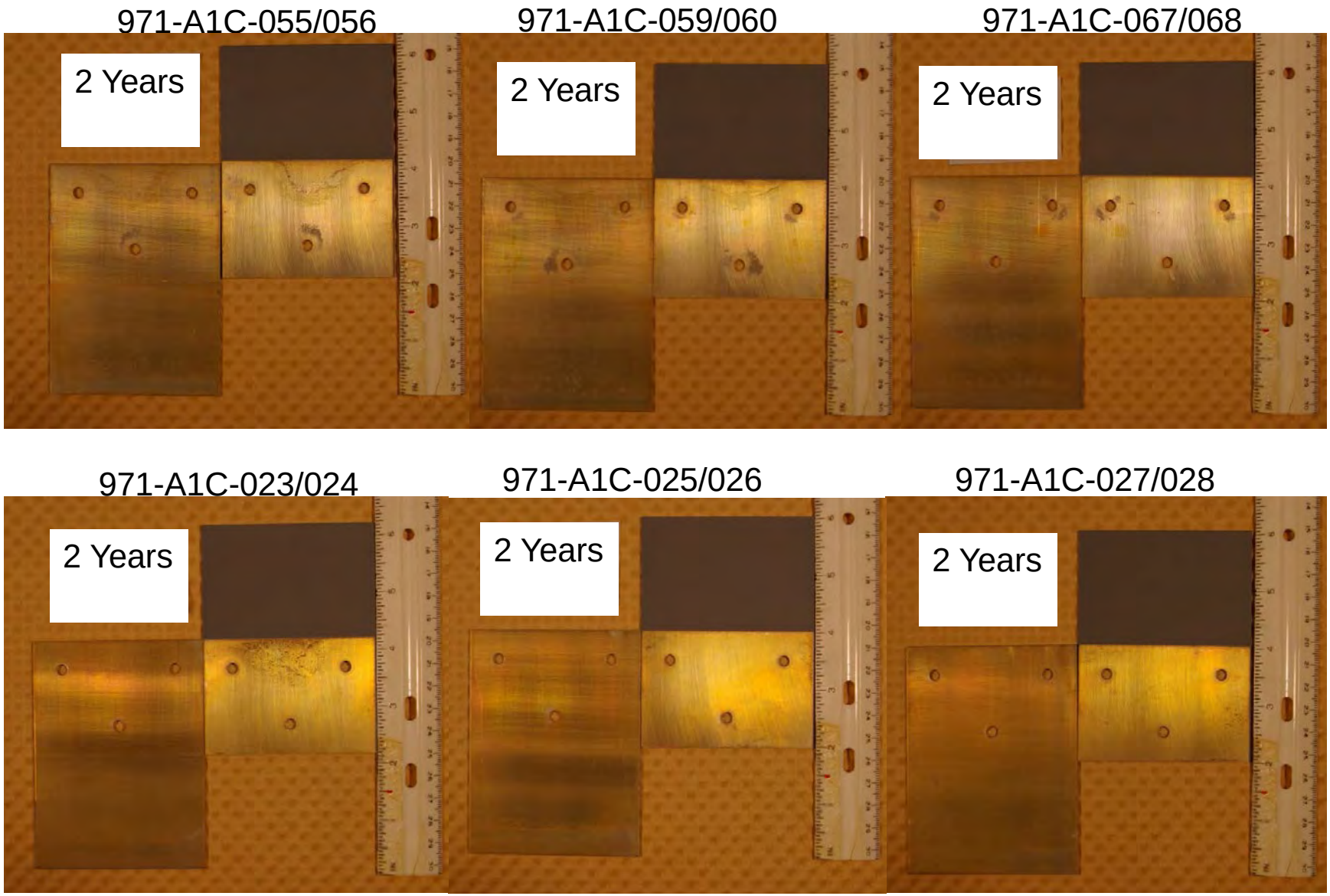


Figure K - 23. Optical images of disassembled AA2024-T3 lap joints coated with full chromate coating system after 2 years exposure on (Top) Tyndall AFB, FL and (Bottom) Kirtland AFB, NM.

Distribution Statement A. Approved for Public Release.

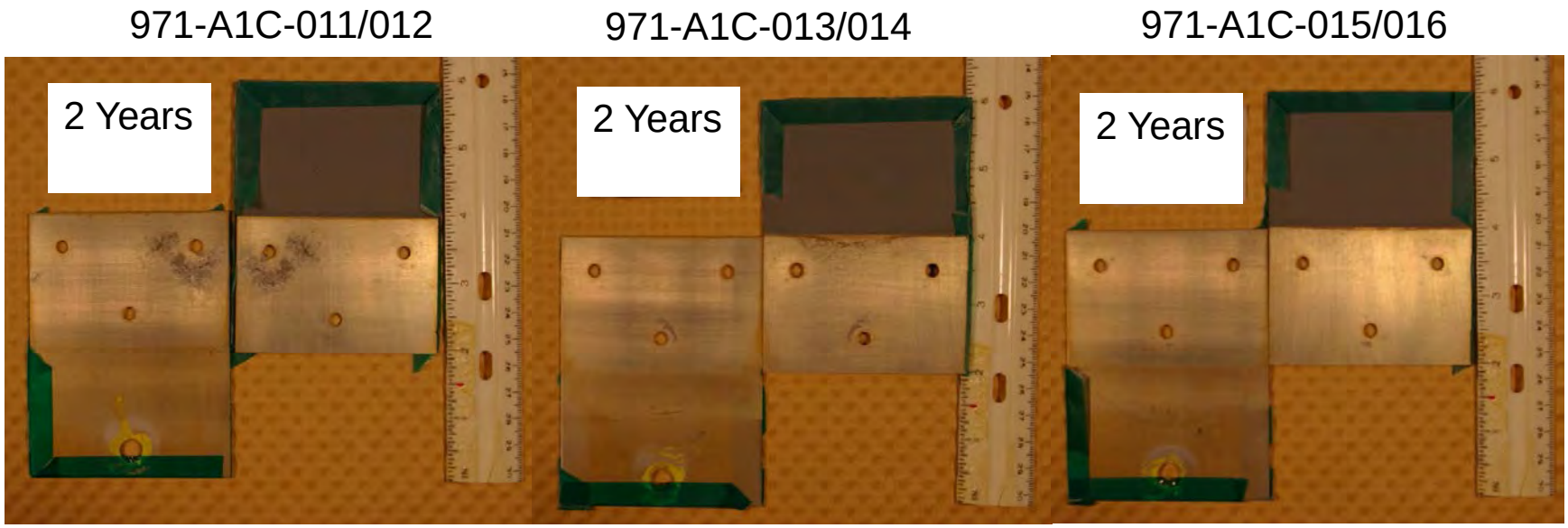


Figure K - 24. Optical images of disassembled AA2024-T3 lap joints coated with full chromate coating system after 2 years exposure at Pt. Judith, RI. The lap joint samples for the 2 year exposure at Wright-Patterson AFB, OH were lost.

Distribution Statement A. Approved for Public Release.

Appendix L

EDS Data for All Field Exposures

Of Coated AA2024-T3 Panels

Locations 1 and 3

Distribution Statement A. Approved for Public Release.

FIGURES

Page

Figure L-1. Plot of relative weight percent of elemental composition at location 1 on full chrome coating system (coating system A) on AA2024-T3 after 1 and 2 years exposure by EDS Figure K-2 3

Figure L-2. Plot of relative weight percent of elemental composition at location 3 on full chrome coating system (coating system A) on AA2024-T3 after 1 and 2 year exposures by EDS 4

Figure L-3. Plot of relative weight percent of elemental composition at location 1 on partial chrome coating system (coating system E) on AA2024-T3 after 1 and 2 year exposures by EDS 5

Figure L-4. Plot of relative weight percent of elemental composition at location 3 on partial chrome coating system (coating system E) on AA2024-T3 after 1 and 2 year exposures by EDS 6

Figure L-5. Plot of relative weight percent of elemental composition at location 1 on non-chrome coating system (coating system F) on AA2024-T3 after 1 and 2 year exposures by EDS 7

Figure L-6. Plot of relative weight percent of elemental composition at location 3 on non-chrome coating system (coating system F) on AA2024-T3 after 1 and 2 year exposures by EDS 8

Figure L-7. Plot of relative weight percent of elemental composition at location 1 on magnesium rich coating system (coating system G) on AA2024-T3 after 1 and 2 year exposures by EDS....9

Figure L-8. Plot of relative weight percent of elemental composition at location 3 on magnesium rich coating system (coating system G) on AA2024-T3 after 1 and 2 year exposures by EDS....10

Figure L-9. Plot of relative weight percent of elemental composition at location 1 on the negative control coating system (coating system I) on AA2024-T3 after 1 and 2 year exposures by EDS 11

Figure L-10. Plot of relative weight percent of elemental composition at location 3 on the negative control coating system (coating system I) on AA2024-T3 after 1 and 2 year exposures by EDS 12

Distribution Statement A. Approved for Public Release.

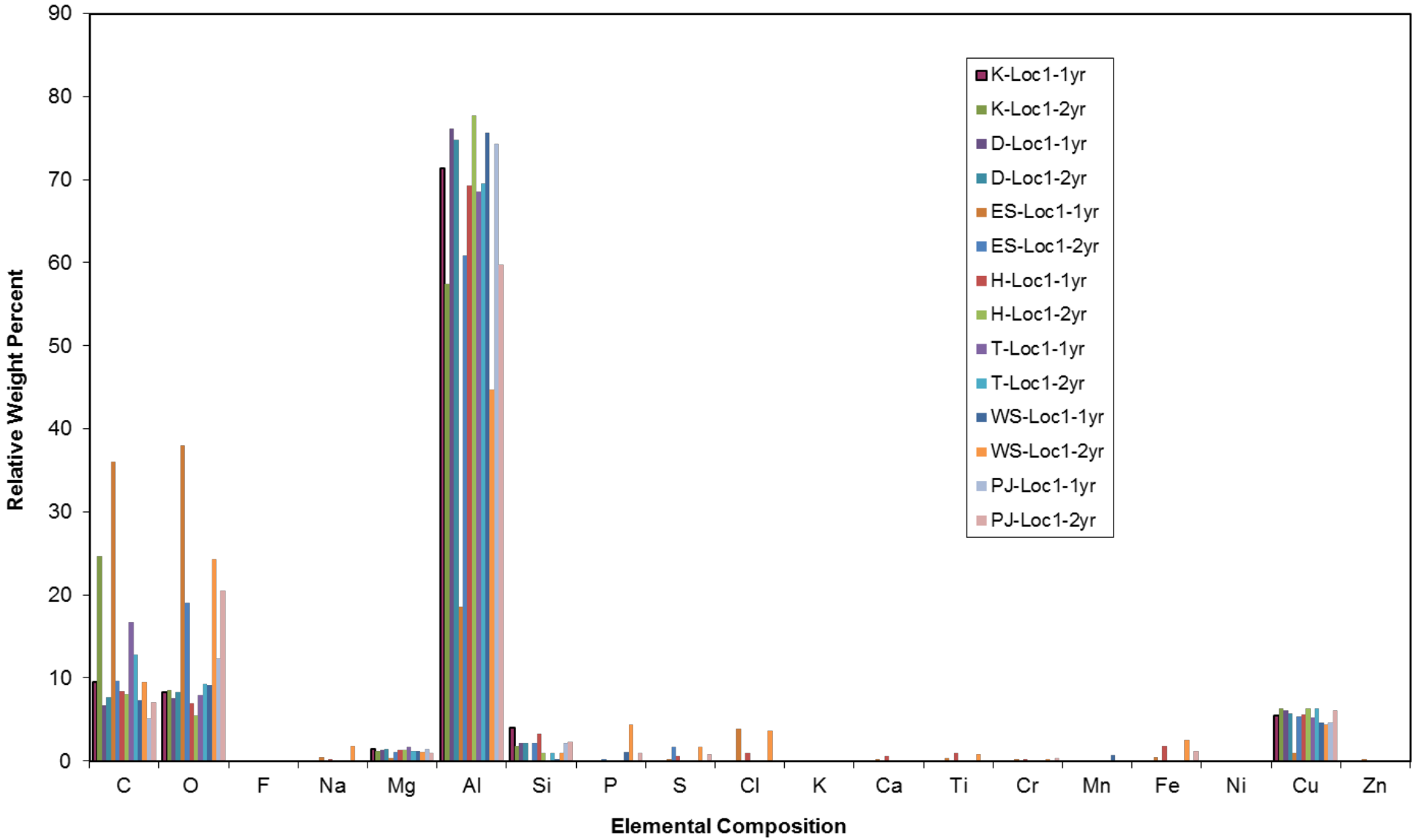


Figure L-1. Plot of relative weight percent of elemental composition at location 1 on full chrome coating system (coating system A) on AA2024-T3 after 1 and 2 years exposure by EDS.

Distribution Statement A. Approved for Public Release.

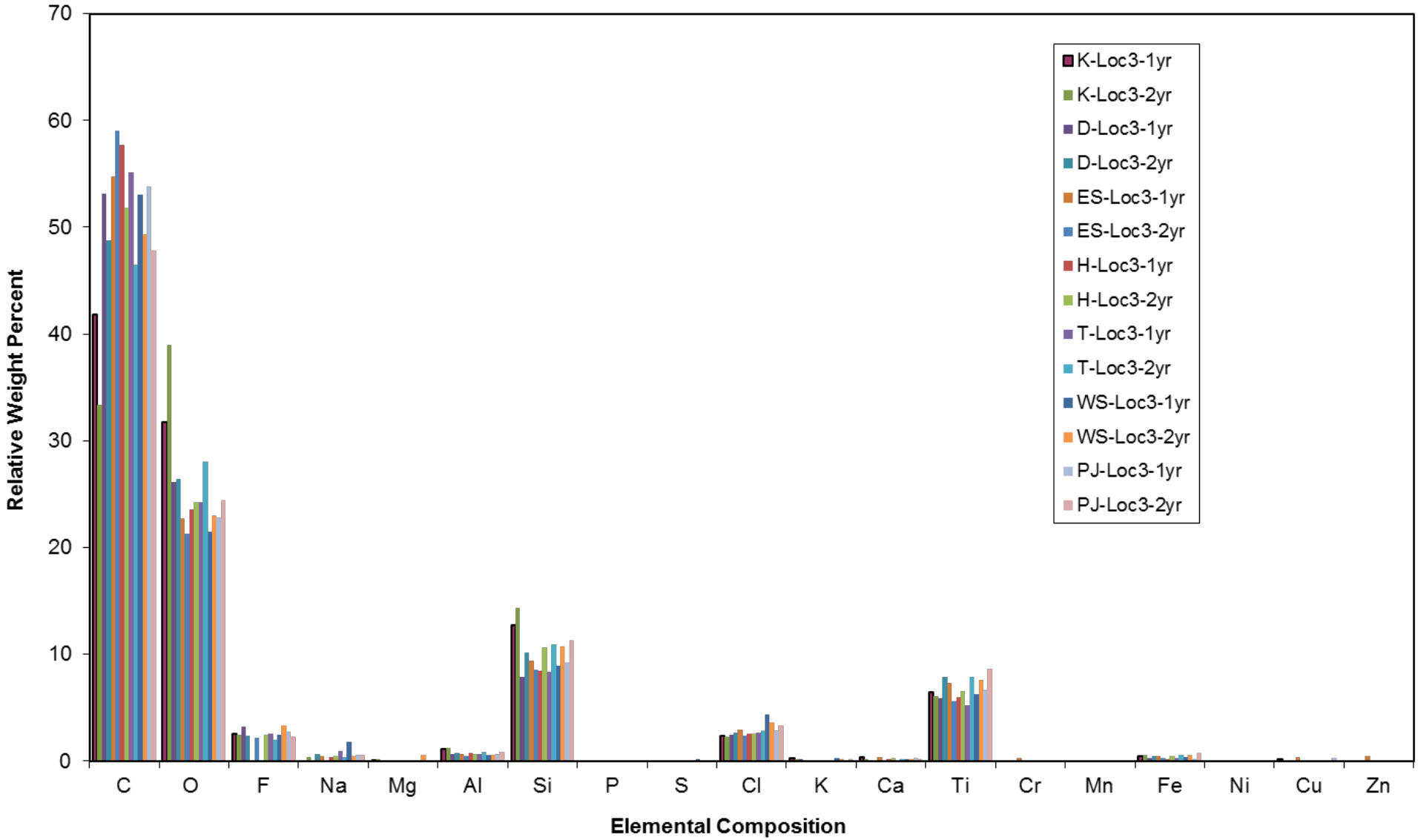


Figure L-2. Plot of relative weight percent of elemental composition at location 3 on full chrome coating system (coating system A) on AA2024-T3 after 1 and 2 year exposures by EDS.

Distribution Statement A. Approved for Public Release.

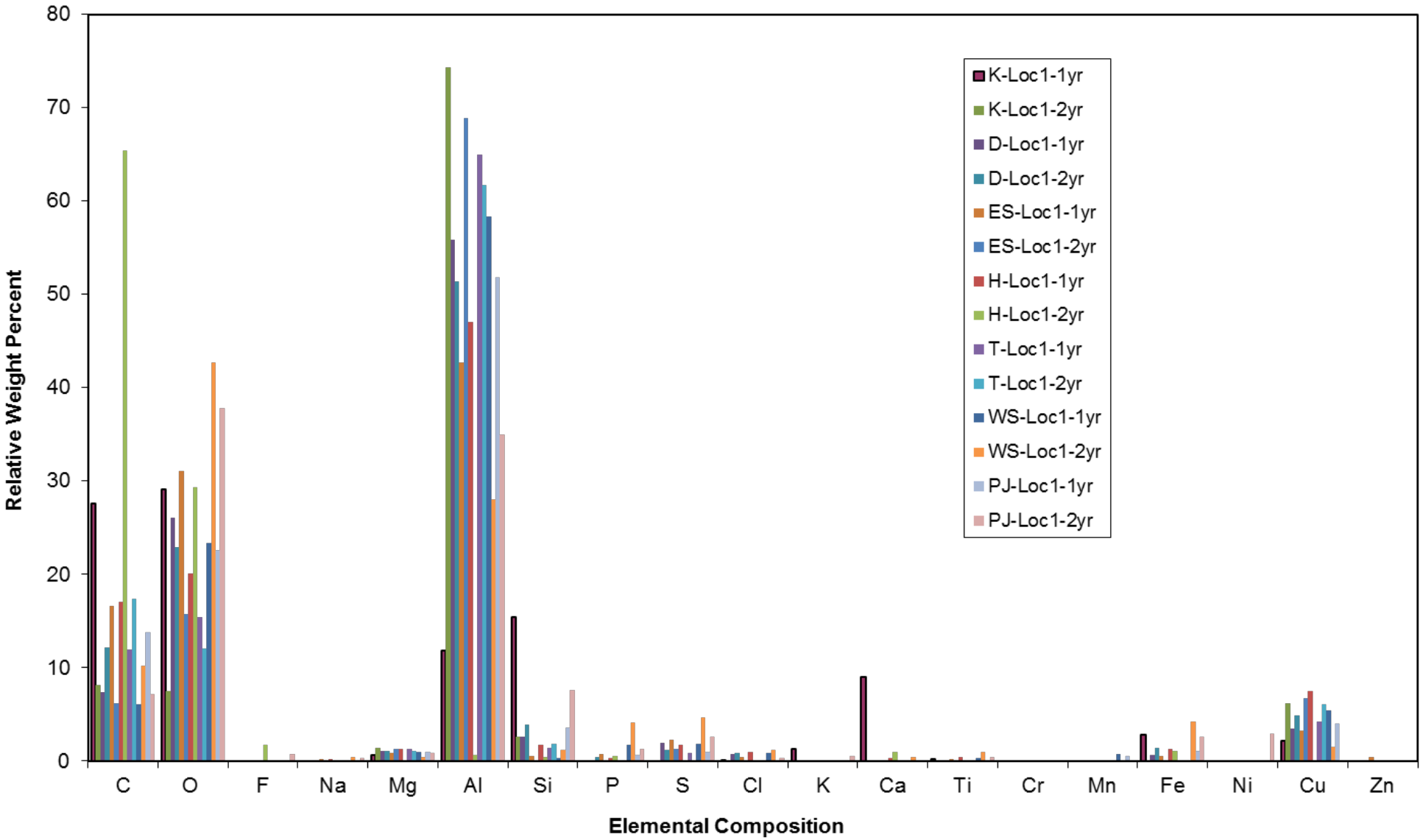


Figure L-3. Plot of relative weight percent of elemental composition at location 1 on partial chrome coating system (coating system E) on AA2024-T3 after 1 and 2 year exposures by EDS.

Distribution Statement A. Approved for Public Release.

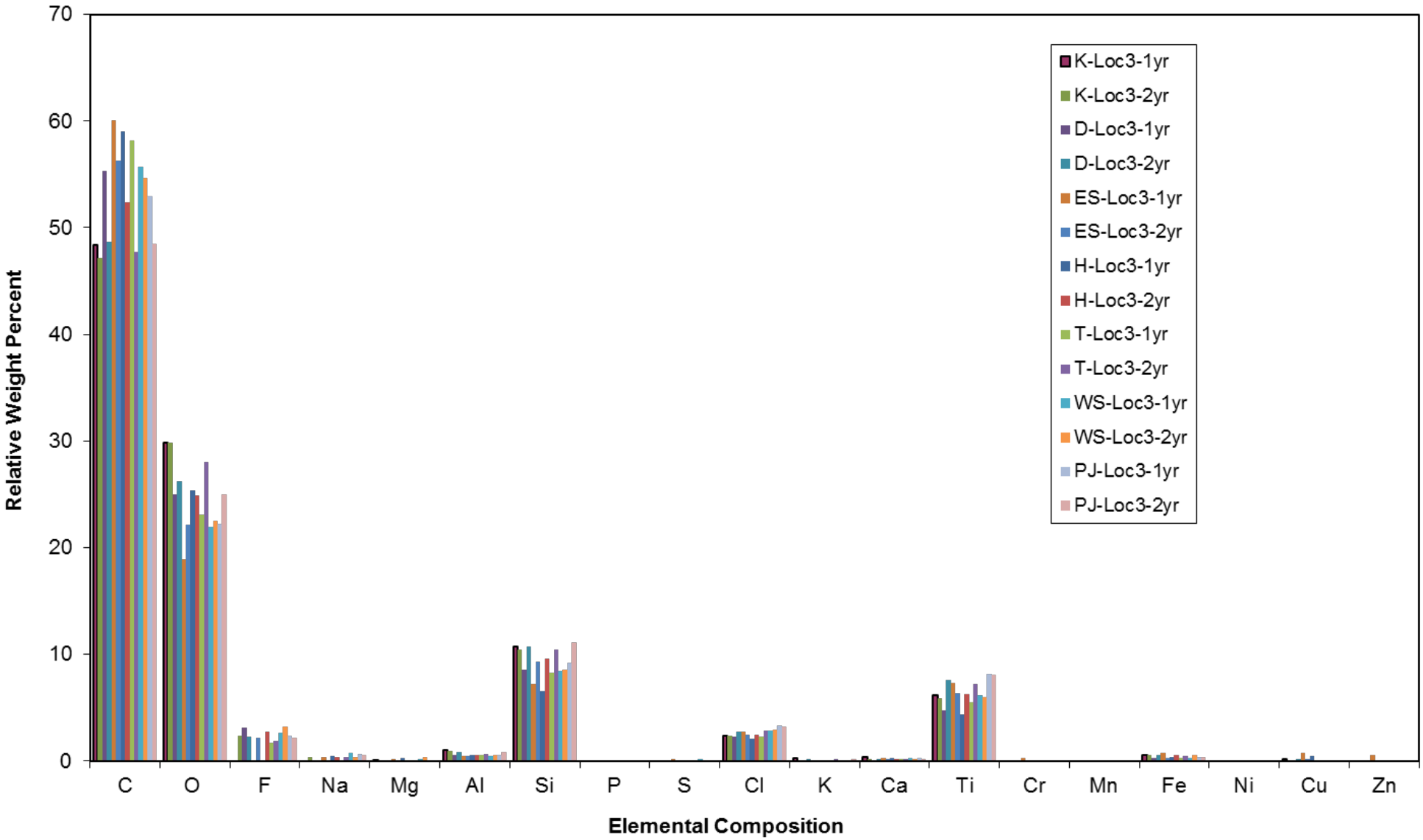


Figure L-4. Plot of relative weight percent of elemental composition at location 3 on partial chrome coating system (coating system E) on AA2024-T3 after 1 and 2 year exposures by EDS.

Distribution Statement A. Approved for Public Release.

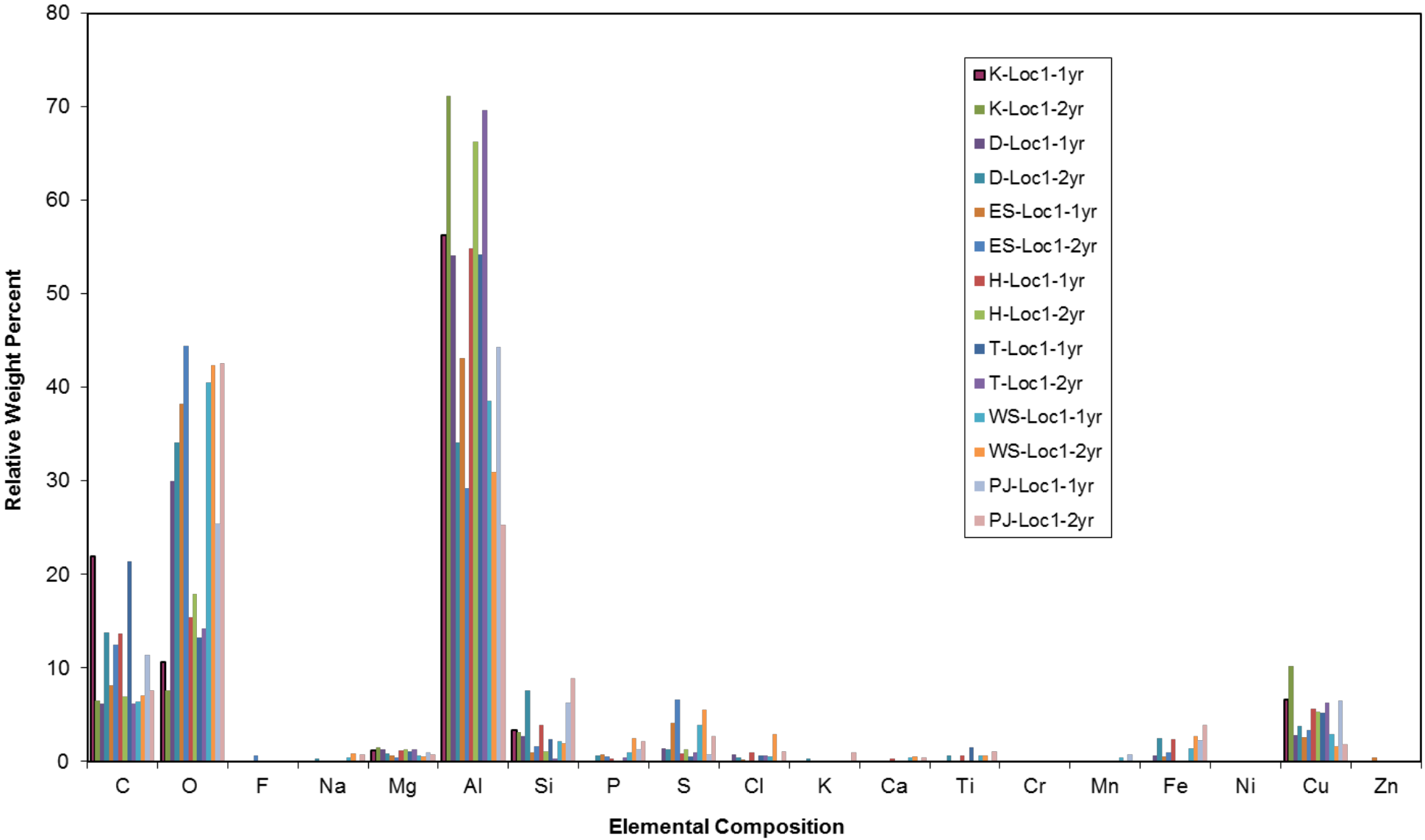


Figure L-5. Plot of relative weight percent of elemental composition at location 1 on non-chrome coating system (coating system F) on AA2024-T3 after 1 and 2 year exposures by EDS.

Distribution Statement A. Approved for Public Release.

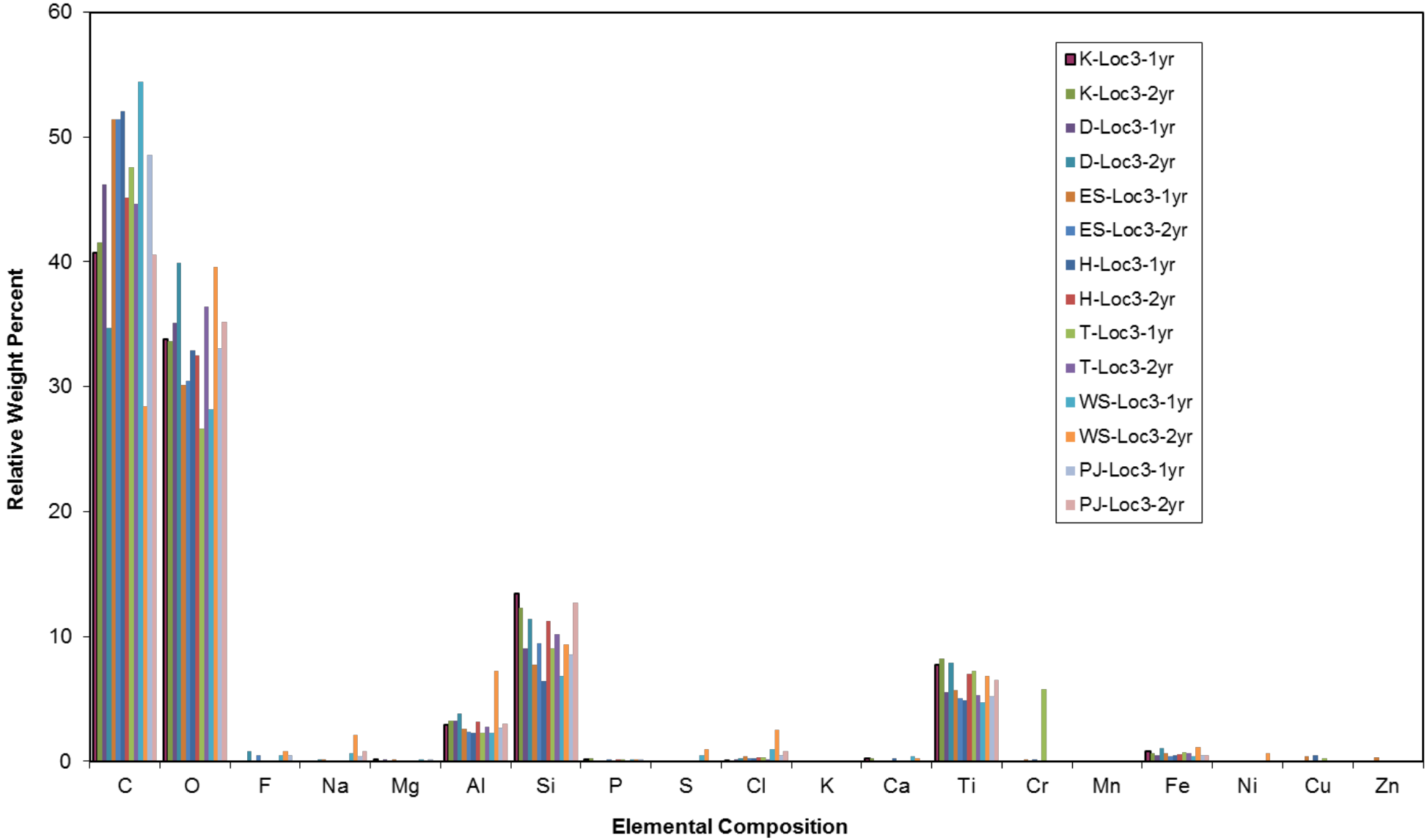


Figure L-6. Plot of relative weight percent of elemental composition at location 3 on non-chrome coating system (coating system F) on AA2024-T3 after 1 and 2 year exposures by EDS.

Distribution Statement A. Approved for Public Release.

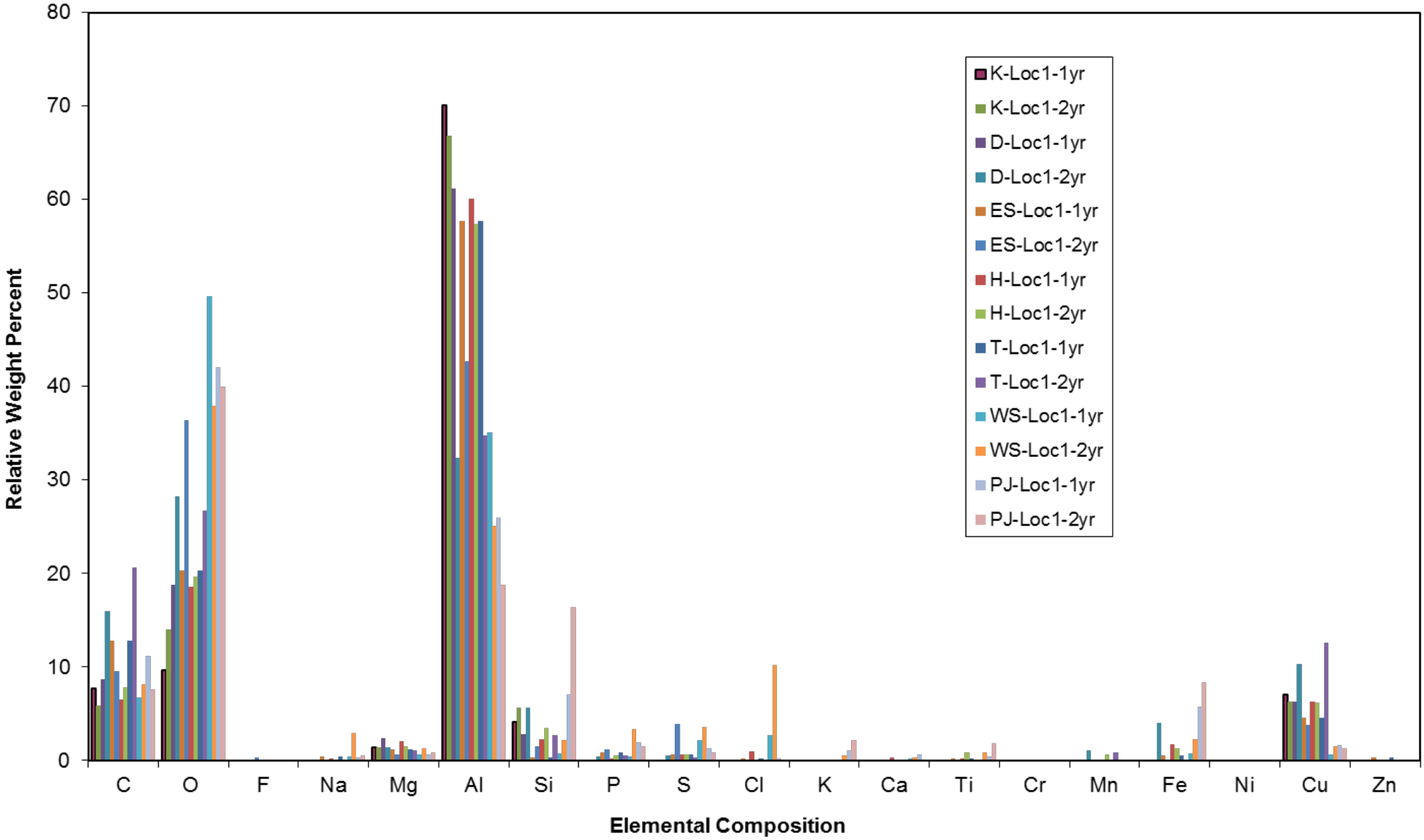


Figure L-7. Plot of relative weight percent of elemental composition at location 1 on magnesium rich coating system (coating system G) on AA2024-T3 after 1 and 2 year exposures by EDS.

Distribution Statement A. Approved for Public Release.

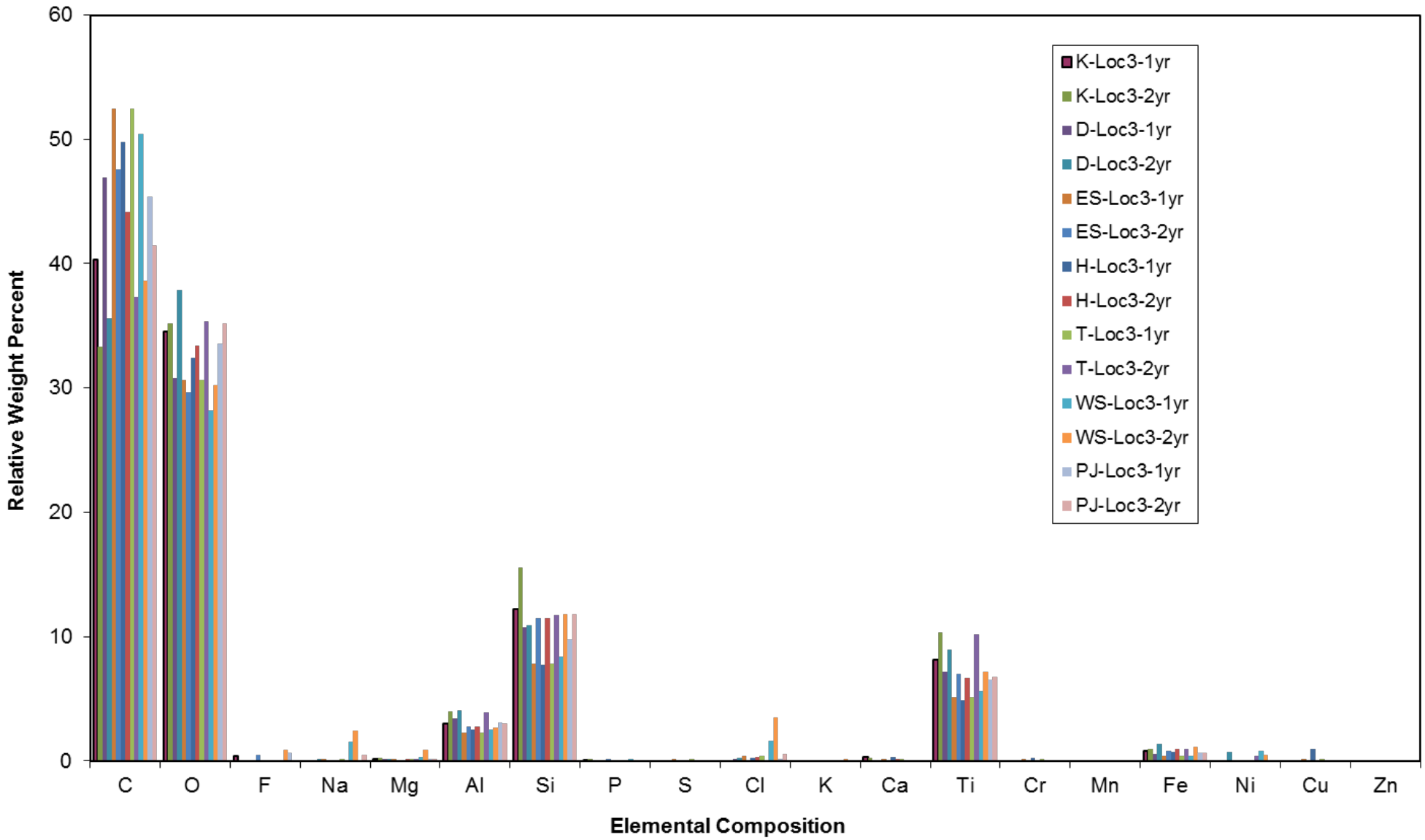


Figure L-8. Plot of relative weight percent of elemental composition at location 3 on magnesium rich coating system (coating system G) on AA2024-T3 after 1 and 2 year exposures by EDS.

Distribution Statement A. Approved for Public Release.

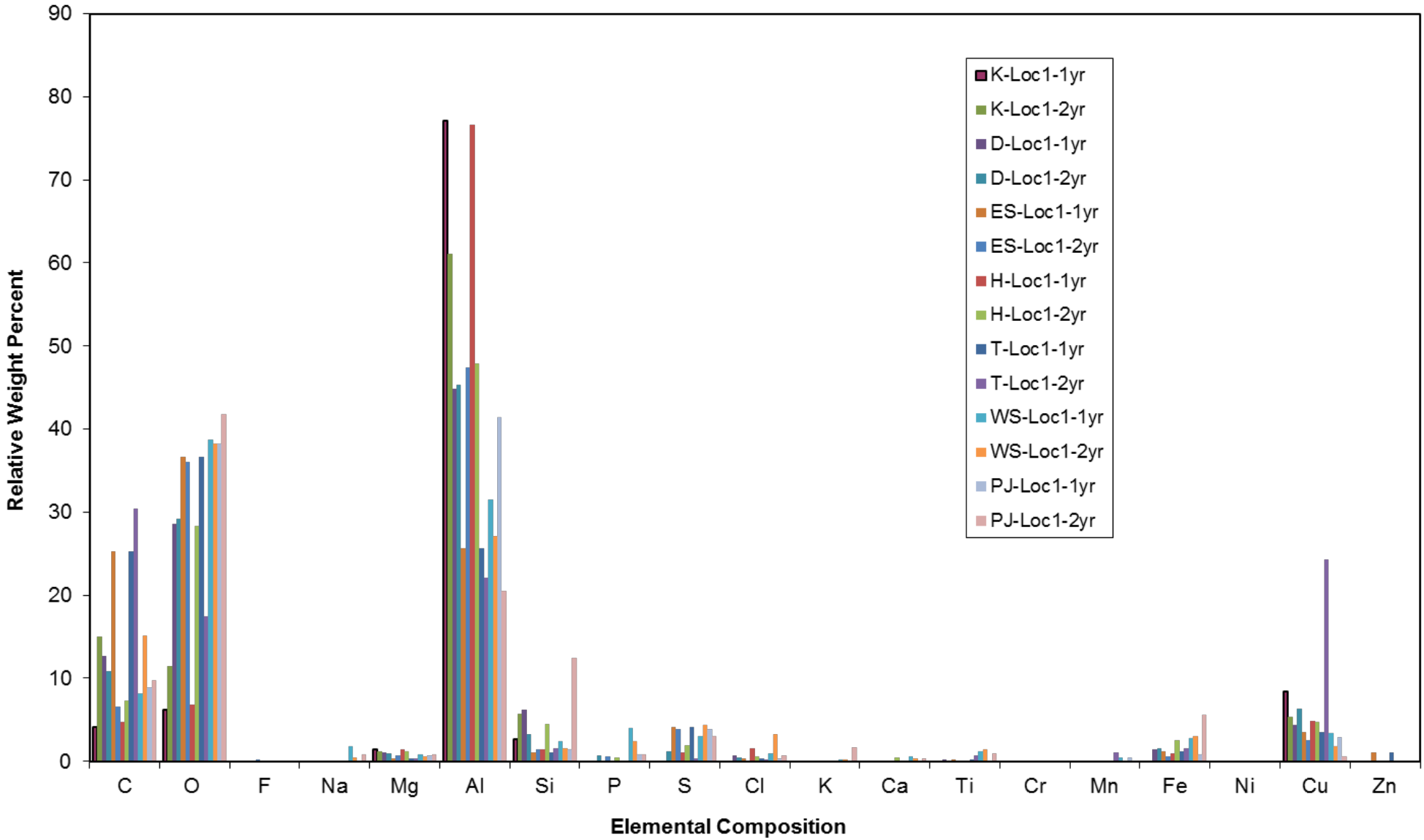


Figure L-9. Plot of relative weight percent of elemental composition at location 1 on the negative control coating system (coating system I) on AA2024-T3 after 1 and 2 year exposures by EDS.

Distribution Statement A. Approved for Public Release.

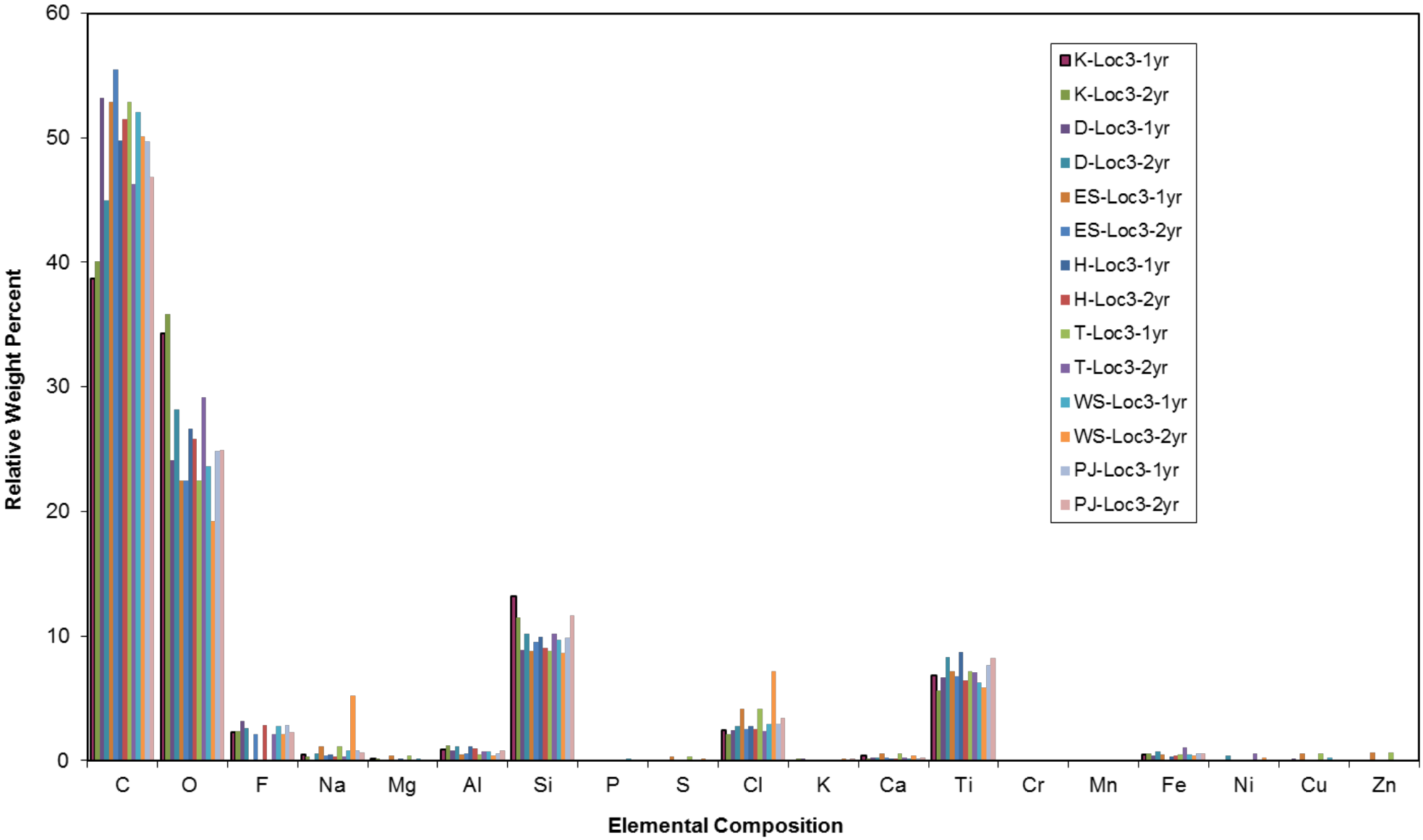


Figure L-10. Plot of relative weight percent of elemental composition at location 3 on the negative control coating system (coating system I) on AA2024-T3 after 1 and 2 year exposures by EDS.

Distribution Statement A. Approved for Public Release.

Appendix M

Scanning Electron Microscopy Images

(High UV and High Ozone Chamber)

Distribution Statement A. Approved for Public Release.

FIGURES

Page

Figure M-1. SEM images of pure silver sample retrieved on 1000 hours exposure from high UV (0.86 W/m2) and high Ozone (800 ppb) chamber. (a) 100X magnification (b) 250X magnification, (c) 500X magnification, and (d) 2000X magnification. 8

Figure M-2.SEM images of pure silver sample retrieved on 900 hours exposure from high UV (0.86 W/m2) and high Ozone (800 ppb) chamber. (a) 100X magnification (b) 250X magnification, (c) 500X magnification, and (d) 2000X magnification. 9

Figure M-3.SEM images of pure silver sample retrieved on 800 hours exposure from high UV (0.86 W/m2) and high Ozone (800 ppb) chamber. (a) 100X magnification (b) 250X magnification, (c) 500X magnification, and (d) 2000X magnification. 10

Figure M-4.SEM images of pure silver sample retrieved on 700 hours exposure from high UV (0.86 W/m2) and high Ozone (800 ppb) chamber. (a) 100X magnification (b) 250X magnification, (c) 500X magnification, and (d) 2000X magnification. 11

Figure M-5. SEM images of pure silver sample retrieved on 600 hours exposure from high UV (0.86 W/m2) and high Ozone (800 ppb) chamber. (a) 100X magnification (b) 250X magnification, (c) 500X magnification, and (d) 2000X magnification. 12

Figure M-6. SEM images of pure silver sample retrieved on 500 hours exposure from high UV (0.86 W/m2) and high Ozone (800 ppb) chamber. (a) 100X magnification (b) 250X magnification, (c) 500X magnification, and (d) 2000X magnification. 13

Figure M-7. SEM images of pure silver sample retrieved on 400 hours exposure from high UV (0.86 W/m2) and high Ozone (800 ppb) chamber. (a) 100X magnification (b) 250X magnification, (c) 500X magnification, and (d) 1000X magnification. 14

Figure M-8. SEM images of pure silver sample retrieved on 300 hours exposure from high UV (0.86 W/m2) and high Ozone (800 ppb) chamber. (a) 100X magnification (b) 250X magnification, (c) 500X magnification and (d) 1000X magnification. 15

Figure M-9. SEM images of pure silver sample retrieved on 200 hours exposure from high UV (0.86 W/m2) and high Ozone (800 ppb) chamber. (a) 100X magnification (b) 250X magnification, (c) 500X magnification, and (d) 1000X magnification. 16

Figure M-10. SEM images of pure silver sample retrieved on 100 hours exposure from high UV (0.86 W/m2) and high Ozone (800 ppb) chamber. (a) 100X magnification (b) 250X magnification, (c) 500X magnification and (d) 1000X magnification. 17

Distribution Statement A. Approved for Public Release.

Figure M-11. SEM images of aluminum alloy 7075 sample retrieved on 1000 hours exposure from high UV (0.86 W/m2) and high Ozone (800 ppb) chamber. (a) 100X magnification (b) 250X magnification, (c) 500X magnification, and (d) 2000X magnification. 18

Figure M-12. SEM images of aluminum alloy 7075 sample retrieved on 900 hours exposure from high UV (0.86 W/m2) and high Ozone (800 ppb) chamber. (a) 100X magnification (b) 250X magnification, (c) 500X magnification, and (d) 2000X magnification. 19

Figure M-13. SEM images of aluminum alloy 7075 sample retrieved on 800 hours exposure from high UV (0.86 W/m2) and high Ozone (800 ppb) chamber. (a) 100X magnification (b) 250X magnification, (c) 500X magnification, and (d) 2000X magnification. 20

Figure M-14. SEM images of aluminum alloy 7075 sample retrieved on 700 hours exposure from high UV (0.86 W/m2) and high Ozone (800 ppb) chamber. (a) 100X magnification (b) 250X magnification, (c) 500X magnification, and (d) 2000X magnification. 21

Figure M-15. SEM images of aluminum alloy 7075 sample retrieved on 600 hours exposure from high UV (0.86 W/m2) and high Ozone (800 ppb) chamber. (a) 100X magnification (b) 250X magnification, (c) 500X magnification, and (d) 2000X magnification. 22

Figure M-16. SEM images of aluminum alloy 7075 sample retrieved on 500 hours exposure from high UV (0.86 W/m2) and high Ozone (800 ppb) chamber. (a) 100X magnification (b) 250X magnification, (c) 500X magnification, and (d) 2000X magnification. 23

Figure M-17. SEM images of aluminum alloy 7075 sample retrieved on 400 hours exposure from high UV (0.86 W/m2) and high Ozone (800 ppb) chamber. (a) 100X magnification (b) 250X magnification, (c) 500X magnification,. and (d) 2000X magnification 24

Figure M-18. SEM images of aluminum alloy 7075 sample retrieved on 300 hours exposure from high UV (0.86 W/m2) and high Ozone (800 ppb) chamber. (a) 100X magnification (b) 250X magnification, (c) 500X magnification, and (d) 2000X magnification. 25

Figure M-19. SEM images of aluminum alloy 7075 sample retrieved on 200 hours exposure from high UV (0.86 W/m2) and high Ozone (800 ppb) chamber. (a) 100X magnification (b) 250X magnification, (c) 500X magnification,. and (d) 2000X magnification 26

Figure M-20. SEM images of aluminum alloy 7075 sample retrieved on 100 hours exposure from high UV (0.86 W/m2) and high Ozone (800 ppb) chamber. (a) 100X magnification (b) 250X magnification, and (c) 500X magnification. 27

Figure M-21. SEM images of aluminum alloy 6061 sample retrieved on 1000 hours exposure from high UV (0.86 W/m2) and high Ozone (800 ppb) chamber. (a) 100X magnification (b) 250X magnification, (c) 500X magnification, and (d) 2000X magnification. 28

Distribution Statement A. Approved for Public Release.

Figure M-22. SEM images of aluminum alloy 6061 sample retrieved on 900 hours exposure from high UV (0.86 W/m2) and high Ozone (800 ppb) chamber. (a) 100X magnification (b) 250X magnification, (c) 500X magnification, and (d) 2000X magnification 29

Figure M-23. SEM images of aluminum alloy 6061 sample retrieved on 800 hours exposure from high UV (0.86 W/m2) and high Ozone (800 ppb) chamber. (a) 100X magnification (b) 250X magnification, (c) 500X magnification, and (d) 2000X magnification 30

Figure M-24. SEM images of aluminum alloy 6061 sample retrieved on 700 hours exposure from high UV (0.86 W/m2) and high Ozone (800 ppb) chamber. (a) 100X magnification (b) 250X magnification, and (c) 500X magnification. 31

Figure M-25. SEM images of aluminum alloy 6061 sample retrieved on 600 hours exposure from high UV (0.86 W/m2) and high Ozone (800 ppb) chamber. (a) 100X magnification (b) 250X magnification, (c) 500X magnification, and (d) 2000X magnification. 32

Figure M-26. SEM images of aluminum alloy 6061 sample retrieved on 500 hours exposure from high UV (0.86 W/m2) and high Ozone (800 ppb) chamber. (a) 100X magnification (b) 250X magnification, (c) 500X magnification, and (d) 2000X magnification. 33

Figure M-27. SEM images of aluminum alloy 6061 sample retrieved on 400 hours exposure from high UV (0.86 W/m2) and high Ozone (800 ppb) chamber. (a) 100X magnification (b) 250X magnification, (c) 500X magnification , and (d) 2000X magnification. 34

Figure M-28. SEM images of aluminum alloy 6061 sample retrieved on 300 hours exposure from high UV (0.86 W/m2) and high Ozone (800 ppb) chamber. (a) 100X magnification (b) 250X magnification, (c) 500X magnification, and (d) 2000X magnification. 35

Figure M-29. SEM images of aluminum alloy 6061 sample retrieved on 200 hours exposure from high UV (0.86 W/m2) and high Ozone (800 ppb) chamber. (a) 100X magnification (b) 250X magnification, (c) 500X magnification , and (d) 2000X magnification. 36

Figure M-30. SEM images of aluminum alloy 6061 sample retrieved on 100 hours exposure from high UV (0.86 W/m2) and high Ozone (800 ppb) chamber. (a) 100X magnification (b) 250X magnification, and (c) 500X magnification. 37

Figure M-31. SEM images of aluminum alloy 2024 sample retrieved on 1000 hours exposure from high UV (0.86 W/m2) and high Ozone (800 ppb) chamber. (a) 100X magnification (b) 250X magnification, and (c) 500X magnification. 38

Figure M-32. SEM images of aluminum alloy 2024 sample retrieved on 900 hours exposure from high UV (0.86 W/m2) and high Ozone (800 ppb) chamber. (a) 100X magnification (b) 250X magnification, and (c) 500X magnification. 39

Distribution Statement A. Approved for Public Release.

Figure M-33. SEM images of aluminum alloy 2024 sample retrieved on 800 hours exposure from high UV (0.86 W/m2) and high Ozone (800 ppb) chamber. (a) 100X magnification (b) 250X magnification, (c) 500X magnification, and (d) 2000X magnification. 40

Figure M-34. SEM images of aluminum alloy 2024 sample retrieved on 700 hours exposure from high UV (0.86 W/m2) and high Ozone (800 ppb) chamber. (a) 100X magnification (b) 250X magnification, (c) 500X magnification, and (d) 2000X magnification. 41

Figure M-35. SEM images of aluminum alloy 2024 sample retrieved on 600 hours exposure from high UV (0.86 W/m2) and high Ozone (800 ppb) chamber. (a) 100X magnification (b) 250X magnification, and (c) 500X magnification. 42

Figure M-36. SEM images of aluminum alloy 2024 sample retrieved on 500 hours exposure from high UV (0.86 W/m2) and high Ozone (800 ppb) chamber. (a) 100X magnification (b) 250X magnification, (c) 500X magnification, and (d) 2000X magnification. 43

Figure M-37. SEM images of aluminum alloy 2024 sample retrieved on 400 hours exposure from high UV (0.86 W/m2) and high Ozone (800 ppb) chamber. (a) 100X magnification (b) 250X magnification, (c) 500X magnification , and (d) 2000X magnification. 44

Figure M-38. SEM images of aluminum alloy 2024 sample retrieved on 300 hours exposure from high UV (0.86 W/m2) and high Ozone (800 ppb) chamber. (a) 100X magnification, (b) 250X magnification, (c) 500X magnification, and (d) 2000X magnification. 45

Figure M-39. SEM images of aluminum alloy 2024 sample retrieved on 200 hours exposure from high UV (0.86 W/m2) and high Ozone (800 ppb) chamber. (a) 100X magnification (b) 250X magnification, (c) 500X magnification , and (d) 2000X magnification. 46

Figure M-40. SEM images of aluminum alloy 2024 sample retrieved on 100 hours exposure from high UV (0.86 W/m2) and high Ozone (800 ppb) chamber. (a) 100X magnification, (b) 250X magnification, and (c) 500X magnification. 47

Figure M-41. SEM images of pure copper sample retrieved on 1000 hours exposure from high UV (0.86 W/m2) and high Ozone (800 ppb) chamber. (a) 100X magnification (b) 250X magnification, (c) 500X magnification, and (d) 2000X magnification. 48

Figure M-42. SEM images of pure copper sample retrieved on 900 hours exposure from high UV (0.86 W/m2) and high Ozone (800 ppb) chamber. (a) 100X magnification (b) 250X magnification, (c) 500X magnification, and (d) 2000X magnification. 49

Figure M-43. SEM images of pure copper sample retrieved on 800 hours exposure from high UV (0.86 W/m2) and high Ozone (800 ppb) chamber. (a) 100X magnification (b) 250X magnification, (c) 500X magnification, and (d) 2000X magnification. 50

Distribution Statement A. Approved for Public Release.

Figure M-44. SEM images of pure copper sample retrieved on 700 hours exposure from high UV (0.86 W/m2) and high Ozone (800 ppb) chamber. (a) 100X magnification (b) 250X magnification, (c) 500X magnification, and (d) 2000X magnification. 51

Figure M-45. SEM images of pure copper sample retrieved on 600 hours exposure from high UV (0.86 W/m2) and high Ozone (800 ppb) chamber. (a) 100X magnification (b) 250X magnification, (c) 500X magnification, and (d) 2000X magnification. 52

Figure M-46. SEM images of pure copper sample retrieved on 500 hours exposure from high UV (0.86 W/m2) and high Ozone (800 ppb) chamber. (a) 100X magnification (b) 250X magnification, (c) 500X magnification, and (d) 2000X magnification. 53

Figure M-47. SEM images of pure copper sample retrieved on 400 hours exposure from high UV (0.86 W/m2) and high Ozone (800 ppb) chamber. (a) 100X magnification (b) 250X magnification, (c) 500X magnification., and (d) 2000X magnification. 54

Figure M-48. SEM images of pure copper sample retrieved on 300 hours exposure from high UV (0.86 W/m2) and high Ozone (800 ppb) chamber. (a) 100X magnification (b) 250X magnification, (c) 500X magnification, and (d) 2000X magnification. 55

Figure M-49. SEM images of pure copper sample retrieved on 200 hours exposure from high UV (0.86 W/m2) and high Ozone (800 ppb) chamber. (a) 100X magnification (b) 250X magnification, (c) 500X magnification., and (d) 2000X magnification. 56

Figure M-50. SEM images of pure copper sample retrieved on 100 hours exposure from high UV (0.86 W/m2) and high Ozone (800 ppb) chamber. (a) 100X magnification (b) 250X magnification, (c) 500X magnification, and (d) 2000X magnification. 57

Figure M-51. SEM images of 1010 steel sample retrieved on 1000 hours exposure from high UV (0.86 W/m2) and high Ozone (800 ppb) chamber. (a) 100X magnification (b) 250X magnification, (c) 500X magnification, and (d) 500X magnification. 58

Figure M-52. SEM images of 1010 steel sample retrieved on 900 hours exposure from high UV (0.86 W/m2) and high Ozone (800 ppb) chamber. (a) 100X magnification (b) 250X magnification, (c) 500X magnification, and (d) 2000X magnification. 59

Figure M-53. SEM images of 1010 steel sample retrieved on 800 hours exposure from high UV (0.86 W/m2) and high Ozone (800 ppb) chamber. (a) 100X magnification (b) 250X magnification, (c) 500X magnification, and (d) 2000X magnification. 60

Figure M-54. SEM images of 1010 steel sample retrieved on 700 hours exposure from high UV (0.86 W/m2) and high Ozone (800 ppb) chamber. (a) 100X magnification (b) 250X magnification, (c) 500X magnification, and (d) 2000X magnification. 61

Distribution Statement A. Approved for Public Release.

Figure M-55. SEM images of 1010 steel sample retrieved on 600 hours exposure from high UV (0.86 W/m2) and high Ozone (800 ppb) chamber. (a) 100X magnification (b) 250X magnification, (c) 500X magnification, and (d) 2000X magnification. 62

Figure M-56. SEM images of 1010 steel sample retrieved on 500 hours exposure from high UV (0.86 W/m2) and high Ozone (800 ppb) chamber. (a) 100X magnification (b) 250X magnification, (c) 500X magnification, and (d) 2000X magnification. 63

Figure M-57. SEM images of 1010 steel sample retrieved on 400 hours exposure from high UV (0.86 W/m2) and high Ozone (800 ppb) chamber. (a) 100X magnification (b) 250X magnification, (c) 500X magnification, and (d) 2000X magnification. 64

Figure M-58. SEM images of 1010 steel sample retrieved on 300 hours exposure from high UV (0.86 W/m2) and high Ozone (800 ppb) chamber. (a) 100X magnification, (b) 250X magnification, (c) 500X magnification, and (d) 2000X magnification. 65

Figure M-59. SEM images of 1010 steel sample retrieved on 200 hours exposure from high UV (0.86 W/m2) and high Ozone (800 ppb) chamber. (a) 100X magnification (b) 250X magnification, (c) 500X magnification, and (d) 2000X magnification. 66

Figure M-60. SEM images of 1010 steel sample retrieved on 100 hours exposure from high UV (0.86 W/m2) and high Ozone (800 ppb) chamber. (a) 100X magnification, (b) 250X magnification, and (c) 500X magnification.. 67

Distribution Statement A. Approved for Public Release.

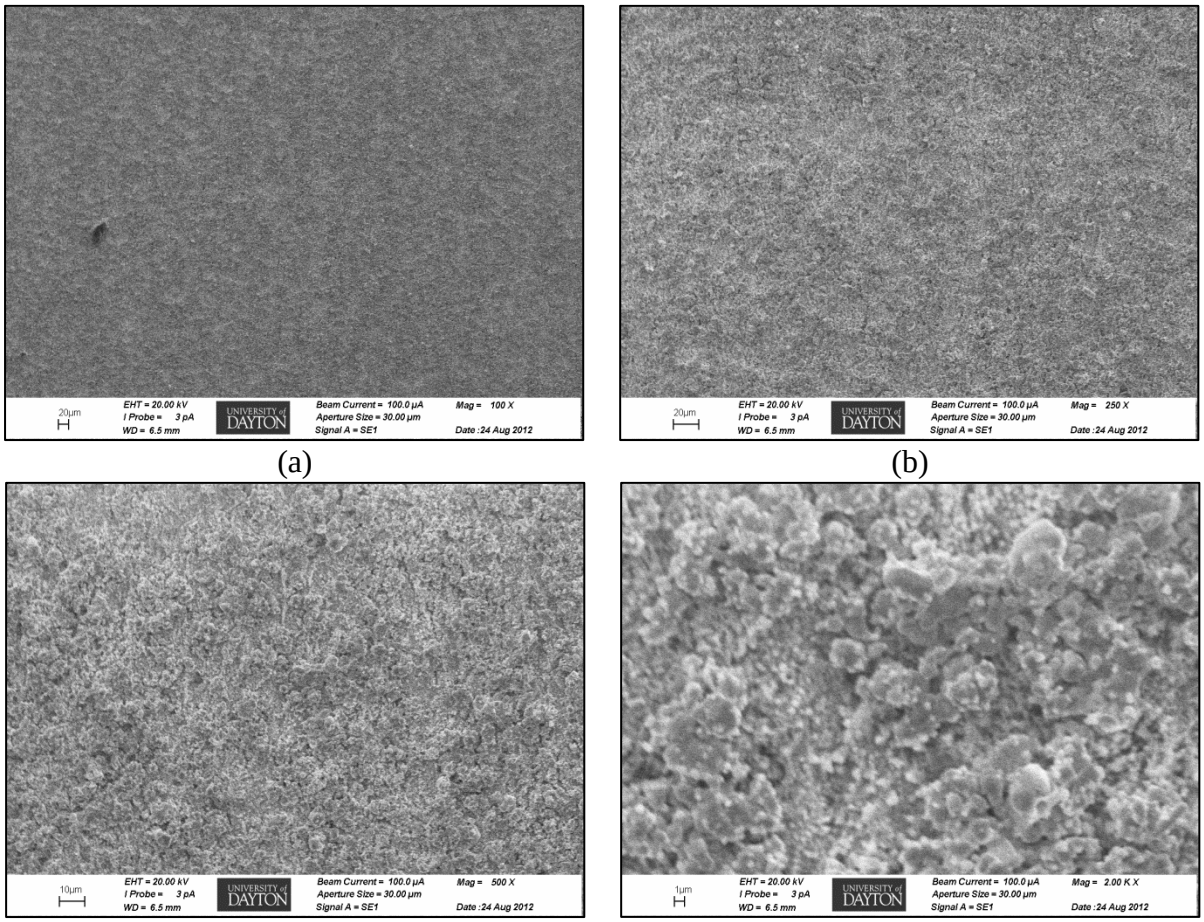


Figure M-1. SEM images of pure silver sample retrieved on 1000 hours exposure from high UV (0.86 W/m2) and high Ozone (800 ppb) chamber. (a) 100X magnification (b) 250X magnification, (c) 500X magnification, and (d) 2000X magnification.

Distribution Statement A. Approved for Public Release.

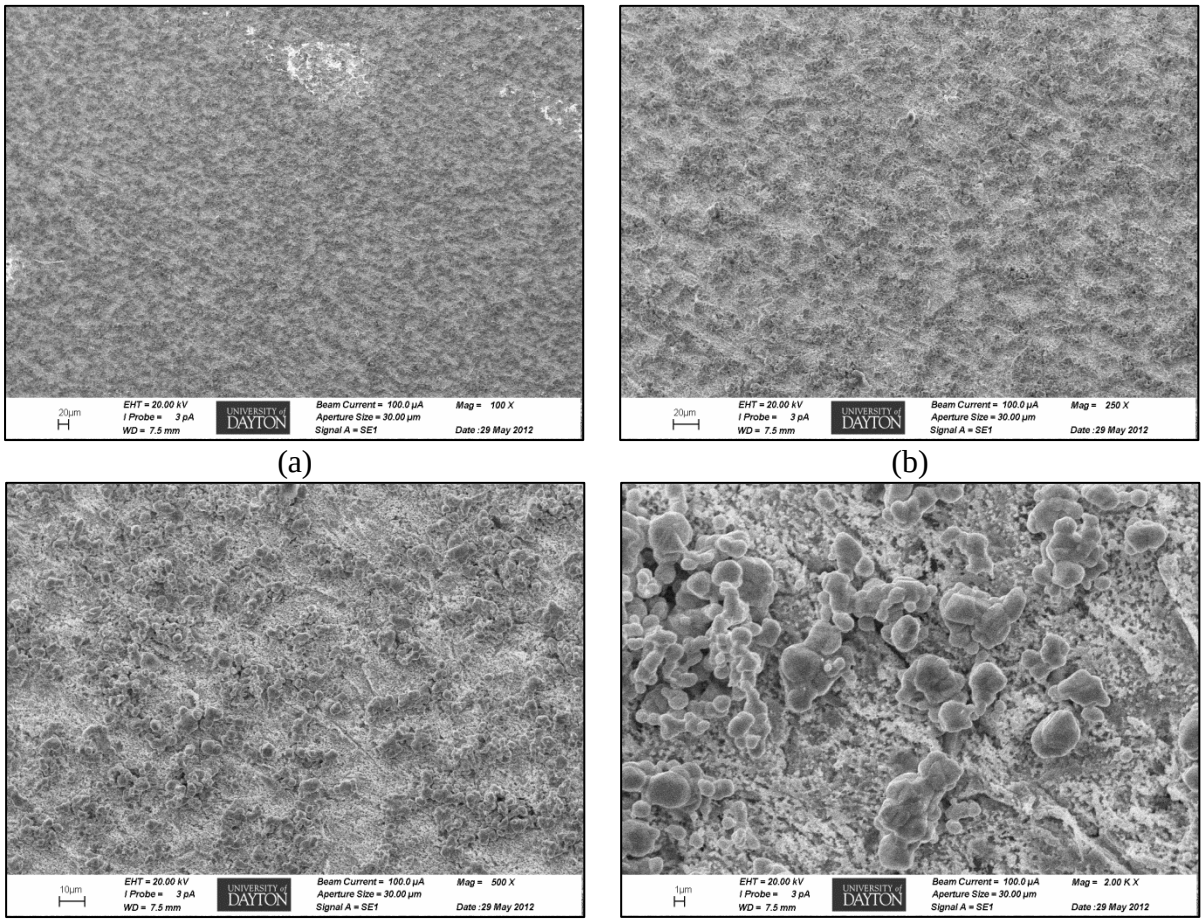


Figure M-2. SEM images of pure silver sample retrieved on 900 hours exposure from high UV (0.86 W/m2) and high Ozone (800 ppb) chamber. (a) 100X magnification (b) 250X magnification, (c) 500X magnification, and (d) 2000X magnification.

Distribution Statement A. Approved for Public Release.

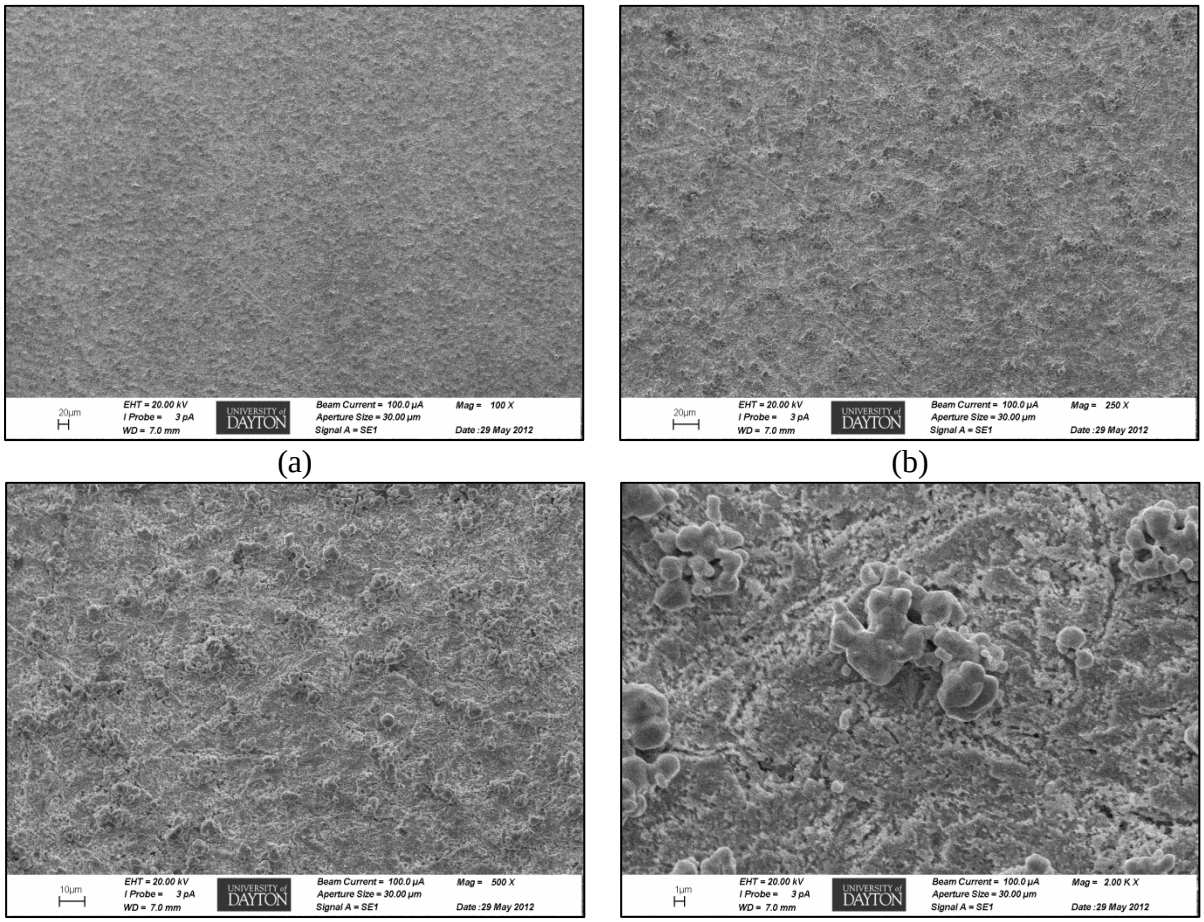


Figure M-3. SEM images of pure silver sample retrieved on 800 hours exposure from high UV (0.86 W/m2) and high Ozone (800 ppb) chamber. (a) 100X magnification (b) 250X magnification, (c) 500X magnification, and (d) 2000X magnification.

Distribution Statement A. Approved for Public Release.

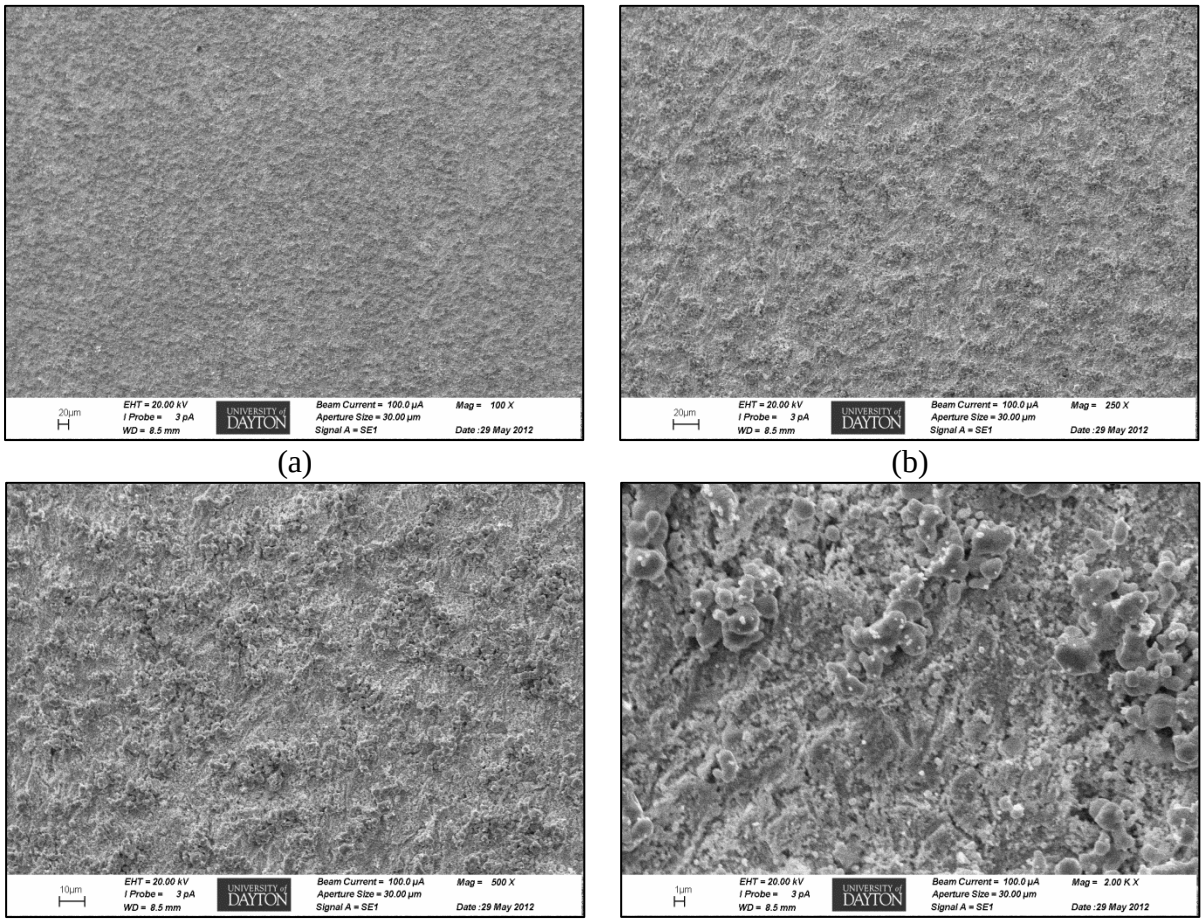


Figure M-4. SEM images of pure silver sample retrieved on 700 hours exposure from high UV (0.86 W/m2) and high Ozone (800 ppb) chamber. (a) 100X magnification (b) 250X magnification, (c) 500X magnification, and (d) 2000X magnification.

Distribution Statement A. Approved for Public Release.

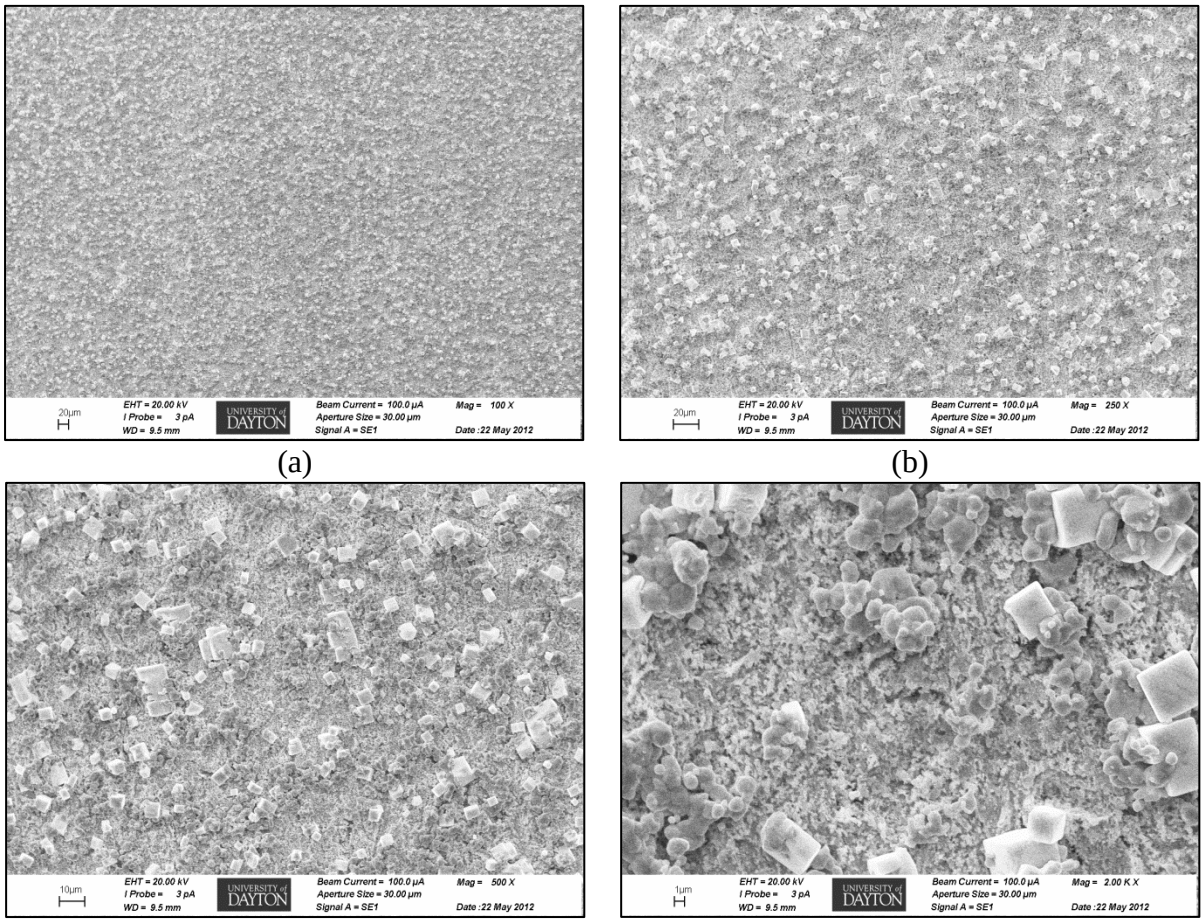


Figure M-5. SEM images of pure silver sample retrieved on 600 hours exposure from high UV (0.86 W/m2) and high Ozone (800 ppb) chamber. (a) 100X magnification (b) 250X magnification, (c) 500X magnification, and (d) 2000X magnification.

Distribution Statement A. Approved for Public Release.

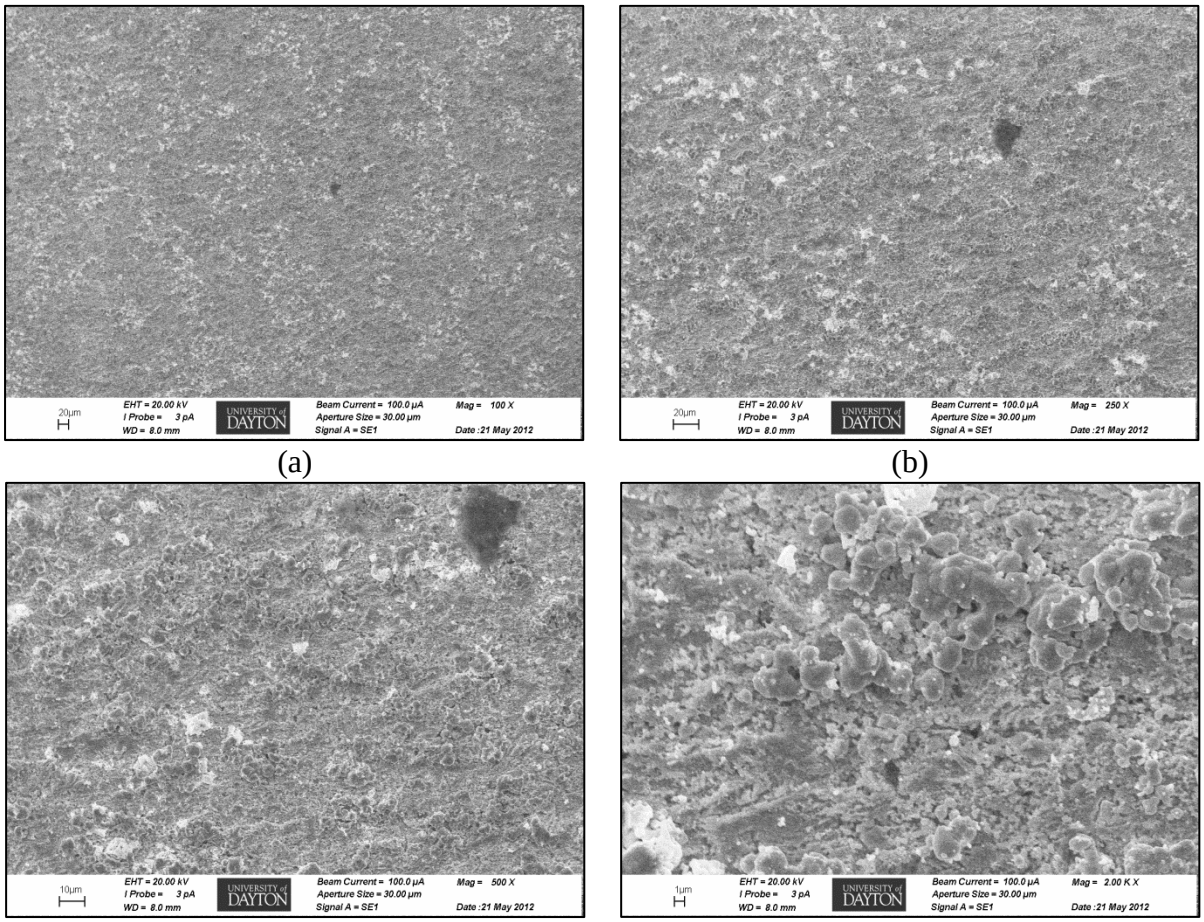


Figure M-6. SEM images of pure silver sample retrieved on 500 hours exposure from high UV (0.86 W/m2) and high Ozone (800 ppb) chamber. (a) 100X magnification (b) 250X magnification, (c) 500X magnification, and (d) 2000X magnification.

Distribution Statement A. Approved for Public Release.

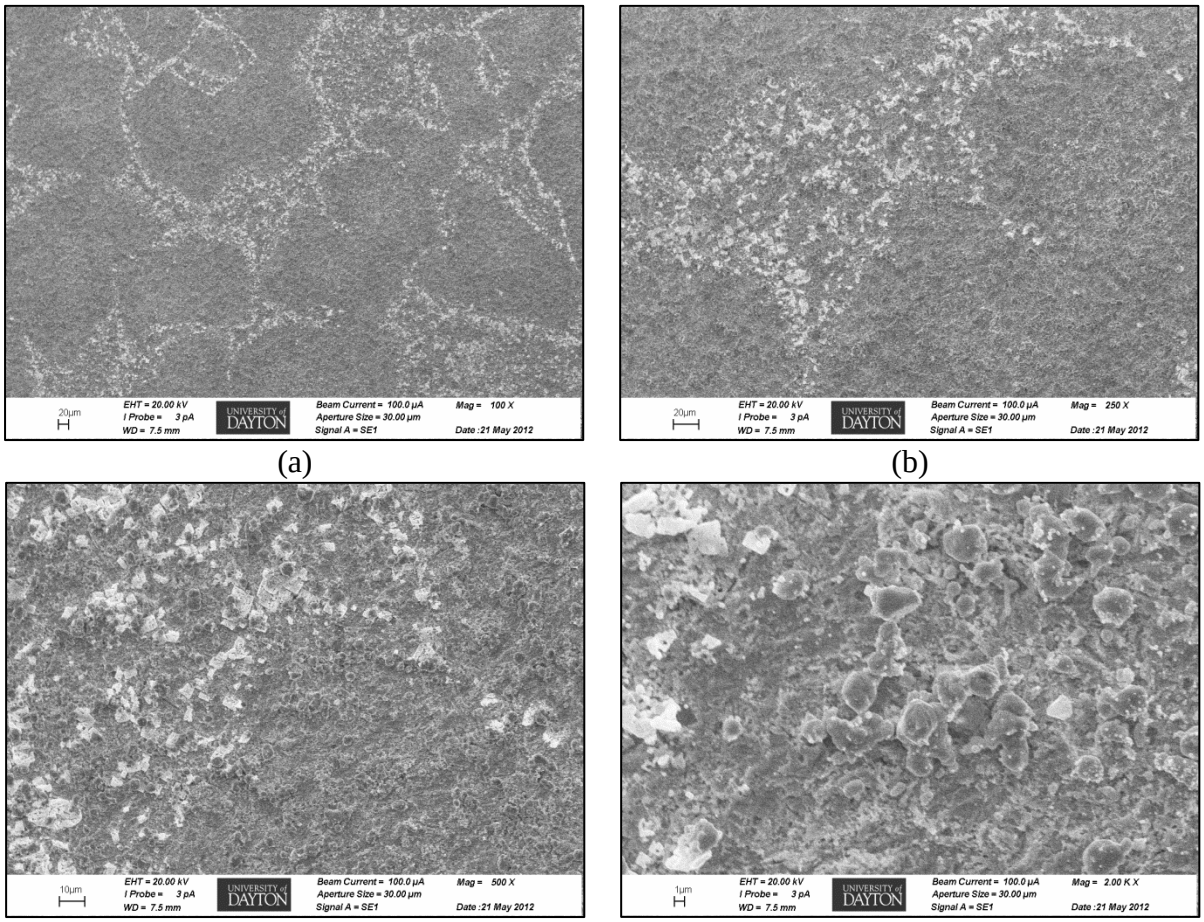


Figure M-7. SEM images of pure silver sample retrieved on 400 hours exposure from high UV (0.86 W/m2) and high Ozone (800 ppb) chamber. (a) 100X magnification (b) 250X magnification, (c) 500X magnification, and (d) 1000X magnification.

Distribution Statement A. Approved for Public Release.

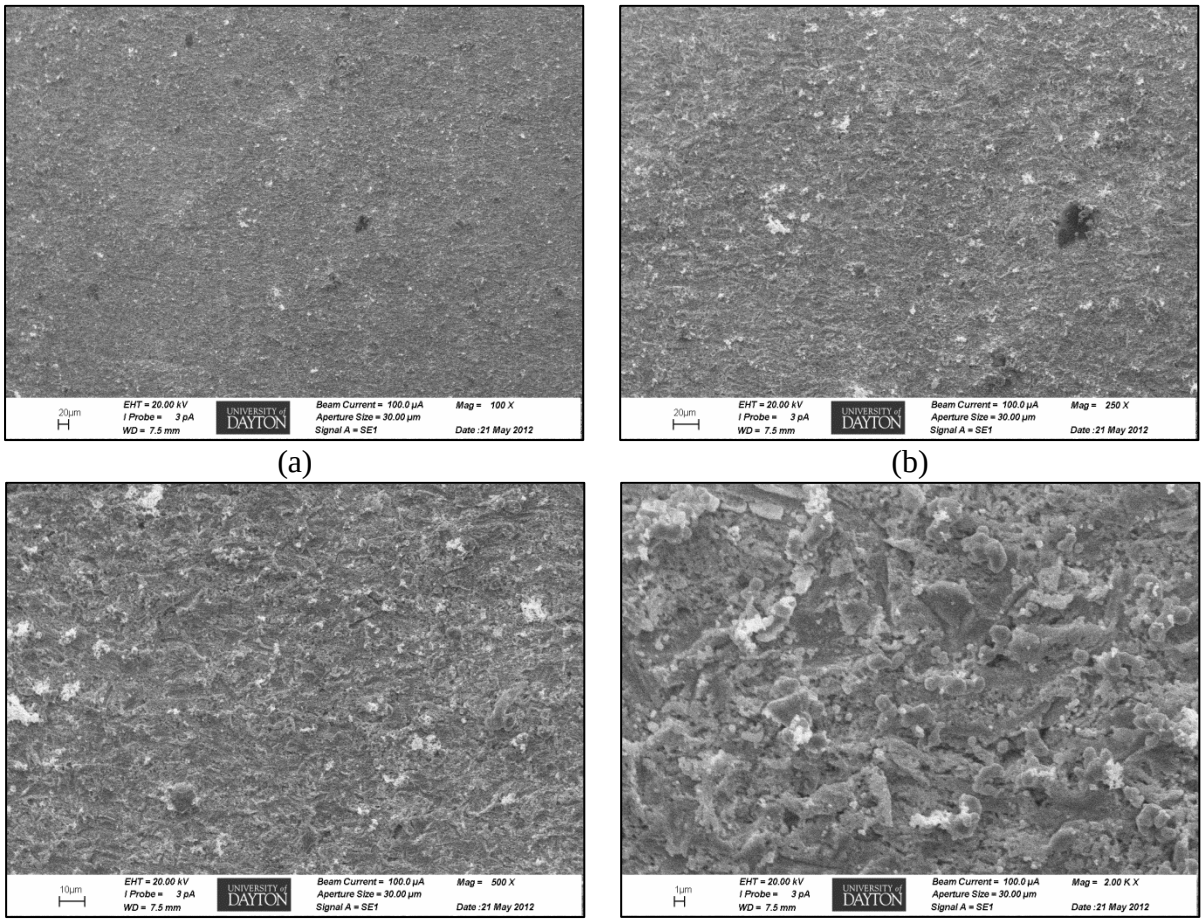


Figure M-8. SEM images of pure silver sample retrieved on 300 hours exposure from high UV (0.86 W/m2) and high Ozone (800 ppb) chamber. (a) 100X magnification (b) 250X magnification, (c) 500X magnification and (d) 1000X magnification.

Distribution Statement A. Approved for Public Release.

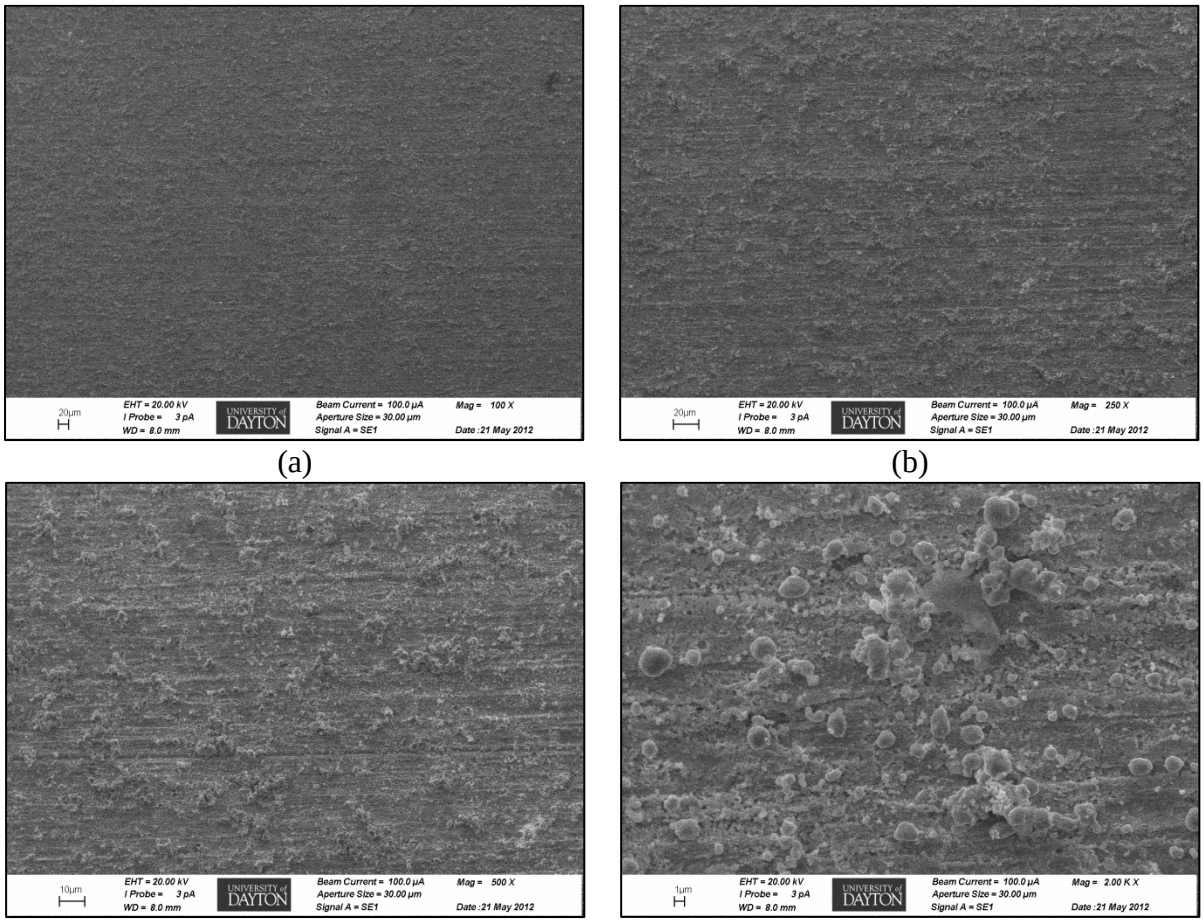


Figure M-9. SEM images of pure silver sample retrieved on 200 hours exposure from high UV (0.86 W/m2) and high Ozone (800 ppb) chamber. (a) 100X magnification (b) 250X magnification, (c) 500X magnification, and (d) 1000X magnification.

Distribution Statement A. Approved for Public Release.

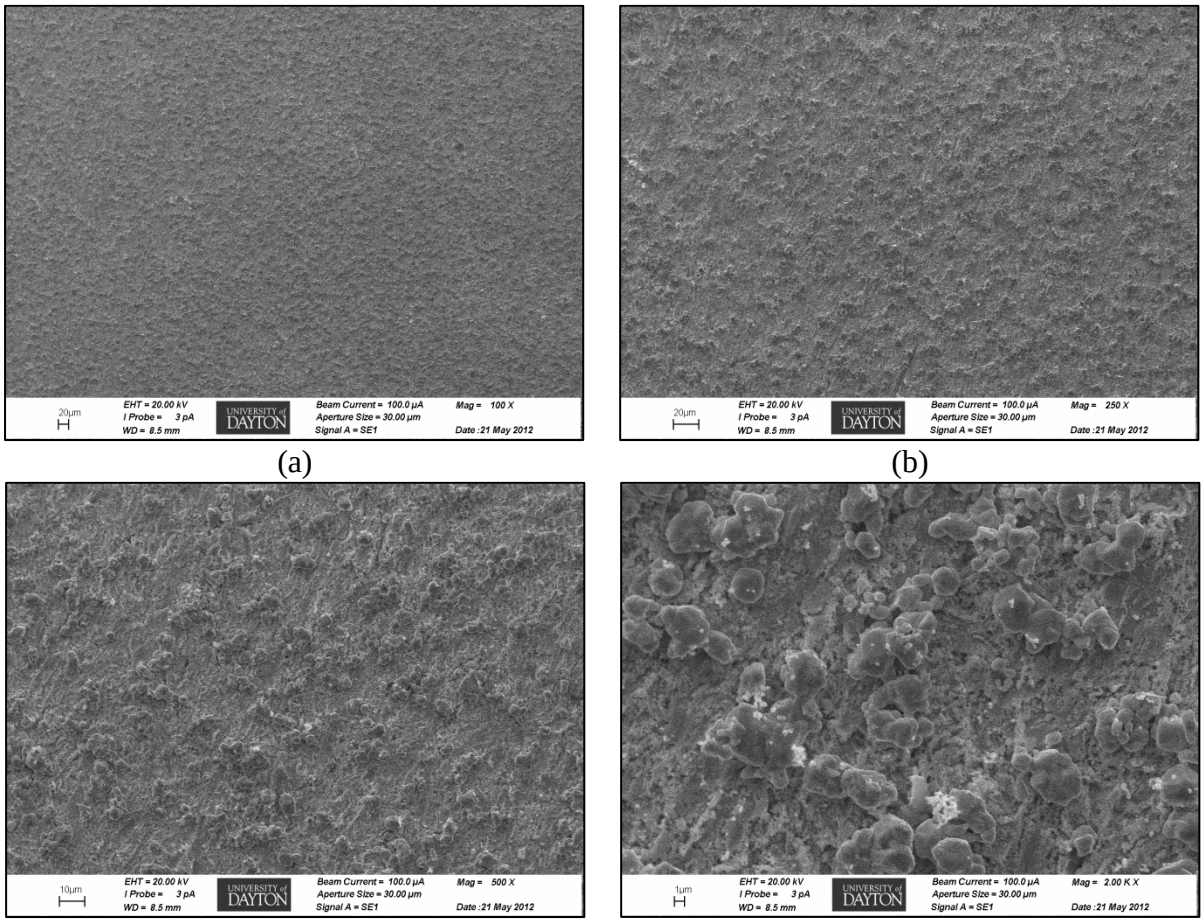


Figure M-10. SEM images of pure silver sample retrieved on 100 hours exposure from high UV (0.86 W/m2) and high Ozone (800 ppb) chamber. (a) 100X magnification (b) 250X magnification, (c) 500X magnification and (d) 1000X magnification.

Distribution Statement A. Approved for Public Release.

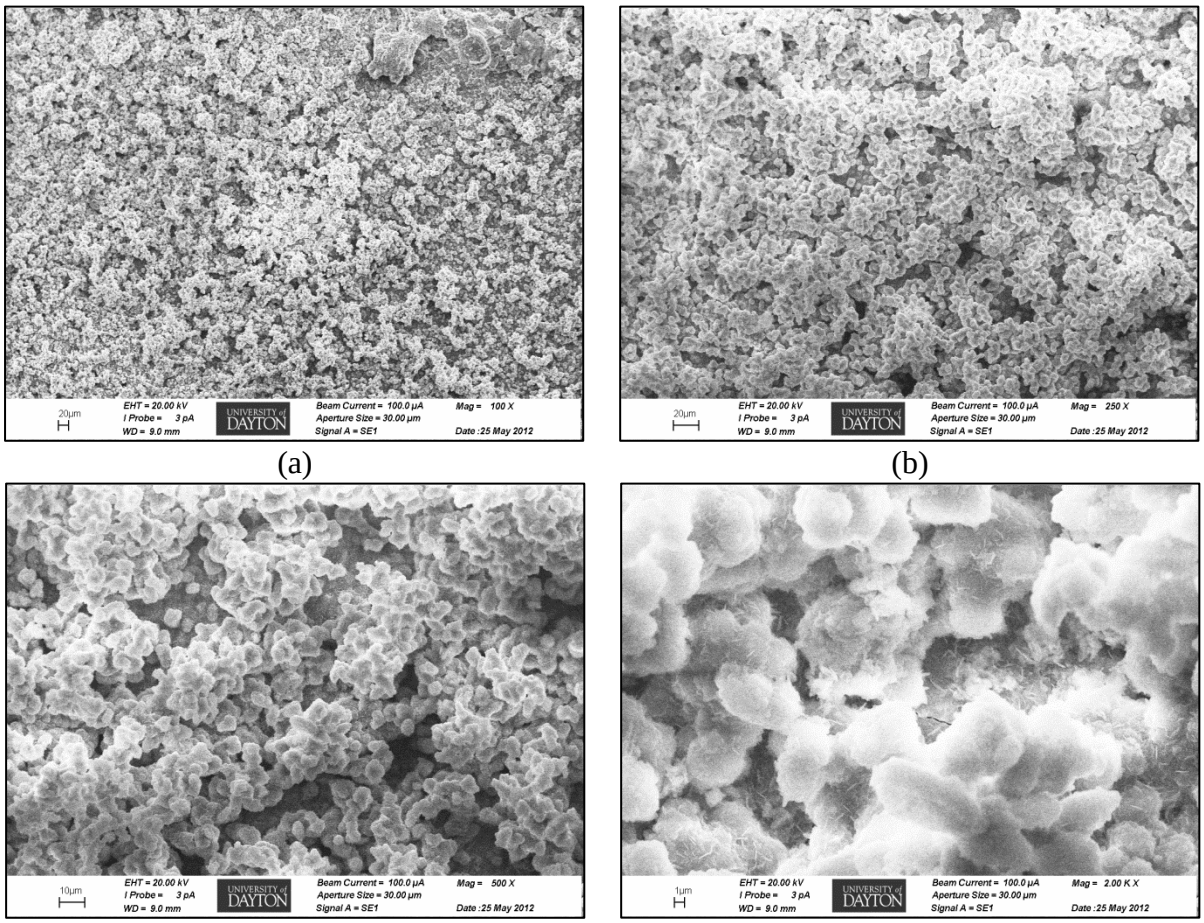


Figure M-11. SEM images of aluminum alloy 7075 sample retrieved on 1000 hours exposure from high UV (0.86 W/m2) and high Ozone (800 ppb) chamber. (a) 100X magnification (b) 250X magnification, (c) 500X magnification, and (d) 2000X magnification.

Distribution Statement A. Approved for Public Release.

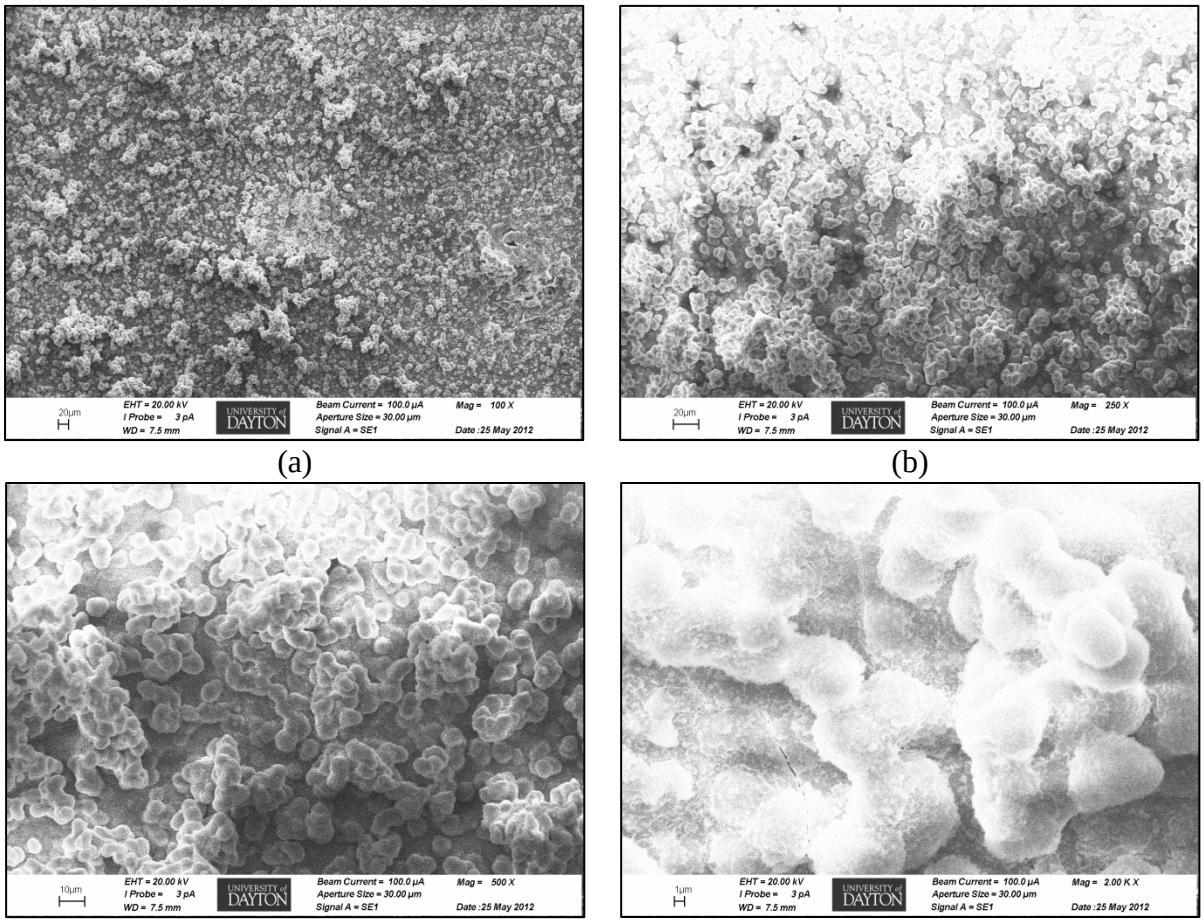
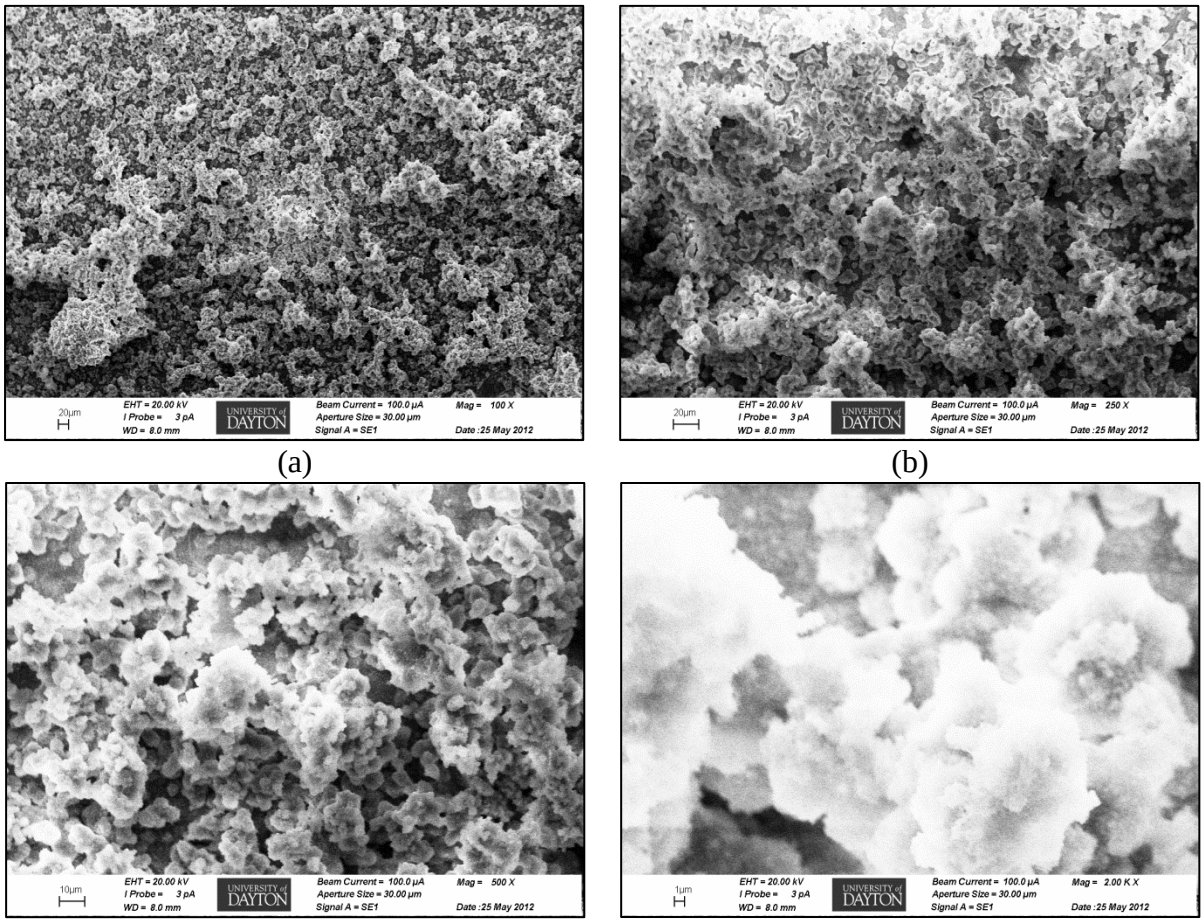


Figure M-12. SEM images of aluminum alloy 7075 sample retrieved on 900 hours exposure from high UV (0.86 W/m2) and high Ozone (800 ppb) chamber. (a) 100X magnification (b) 250X magnification, (c) 500X magnification, and (d) 2000X magnification.

Distribution Statement A. Approved for Public Release.

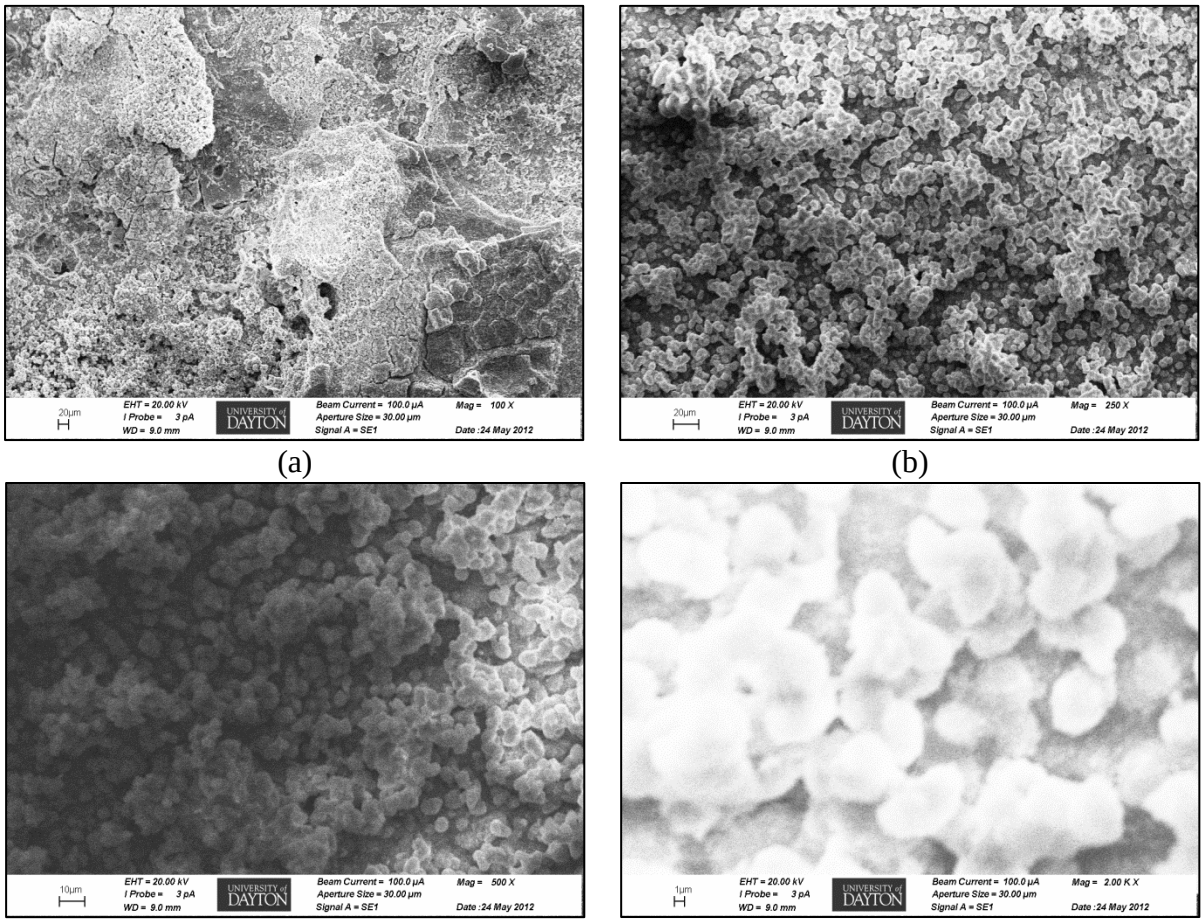


(a) (b)

(c) (d)

Figure M-13. SEM images of aluminum alloy 7075 sample retrieved on 800 hours exposure from high UV (0.86 W/m2) and high Ozone (800 ppb) chamber. (a) 100X magnification (b) 250X magnification, (c) 500X magnification, and (d) 2000X magnification.

Distribution Statement A. Approved for Public Release.



(a) (b)

(c) (d)

Figure M-14. SEM images of aluminum alloy 7075 sample retrieved on 700 hours exposure from high UV (0.86 W/m2) and high Ozone (800 ppb) chamber. (a) 100X magnification (b) 250X magnification, (c) 500X magnification, and (d) 2000X magnification.

Distribution Statement A. Approved for Public Release.

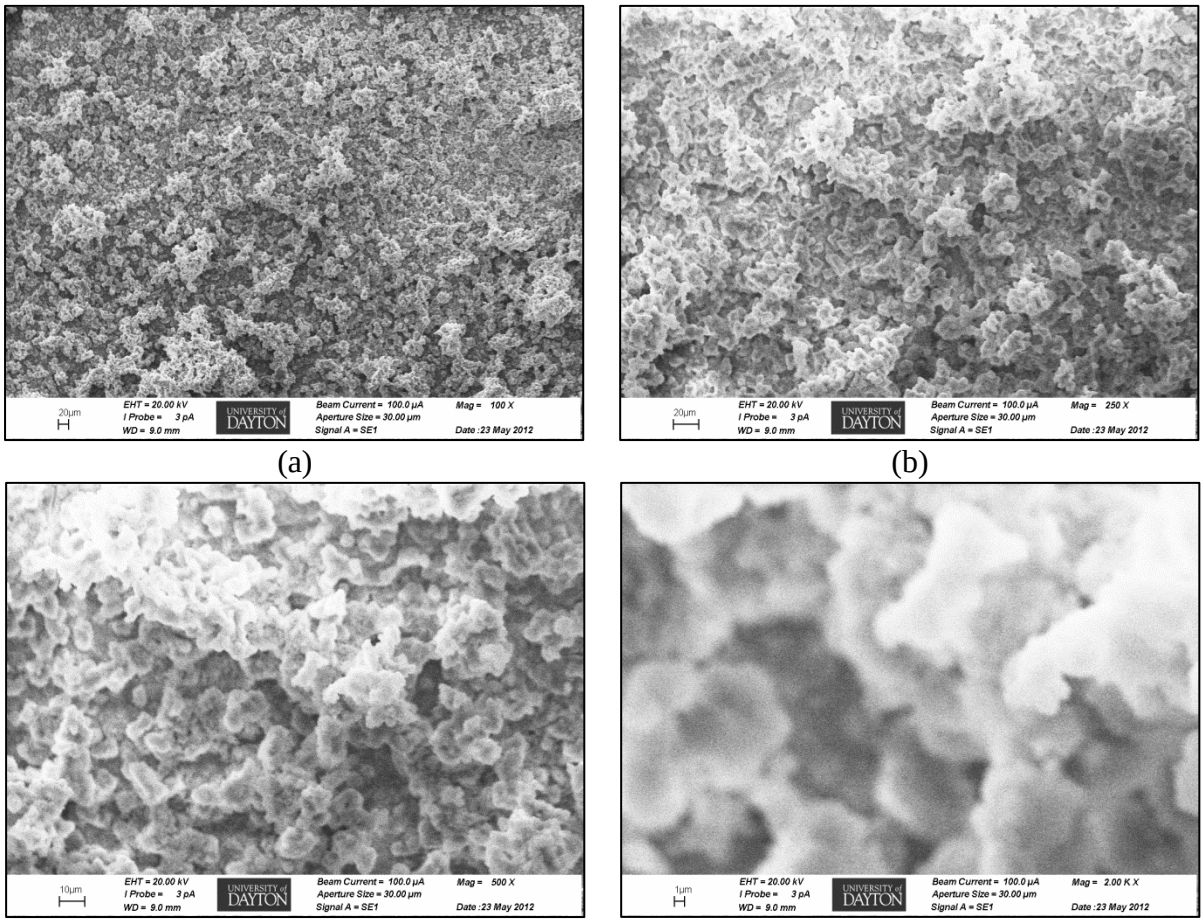


Figure M-15. SEM images of aluminum alloy 7075 sample retrieved on 600 hours exposure from high UV (0.86 W/m2) and high Ozone (800 ppb) chamber. (a) 100X magnification (b) 250X magnification, (c) 500X magnification, and (d) 2000X magnification.

Distribution Statement A. Approved for Public Release.

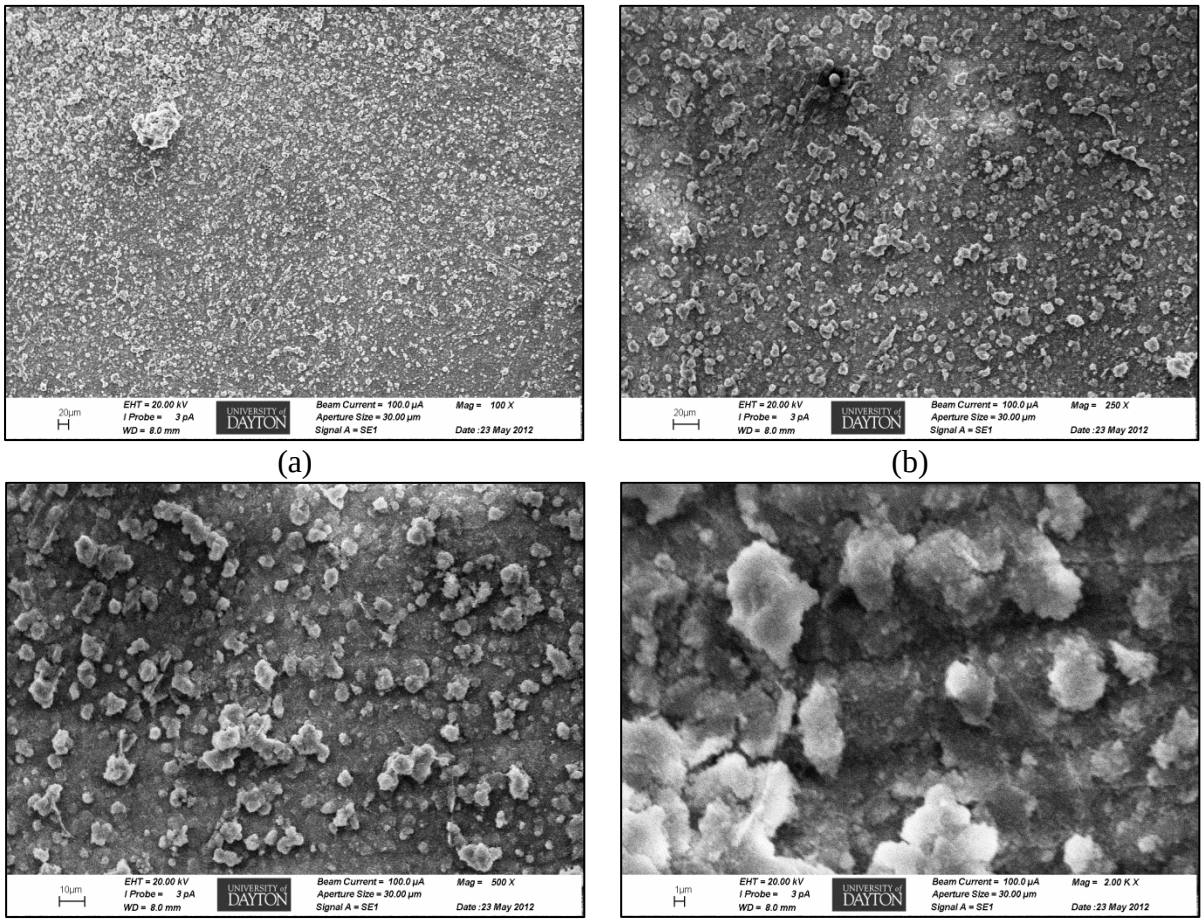


Figure M-16. SEM images of aluminum alloy 7075 sample retrieved on 500 hours exposure from high UV (0.86 W/m2) and high Ozone (800 ppb) chamber. (a) 100X magnification (b) 250X magnification, (c) 500X magnification, and (d) 2000X magnification.

Distribution Statement A. Approved for Public Release.

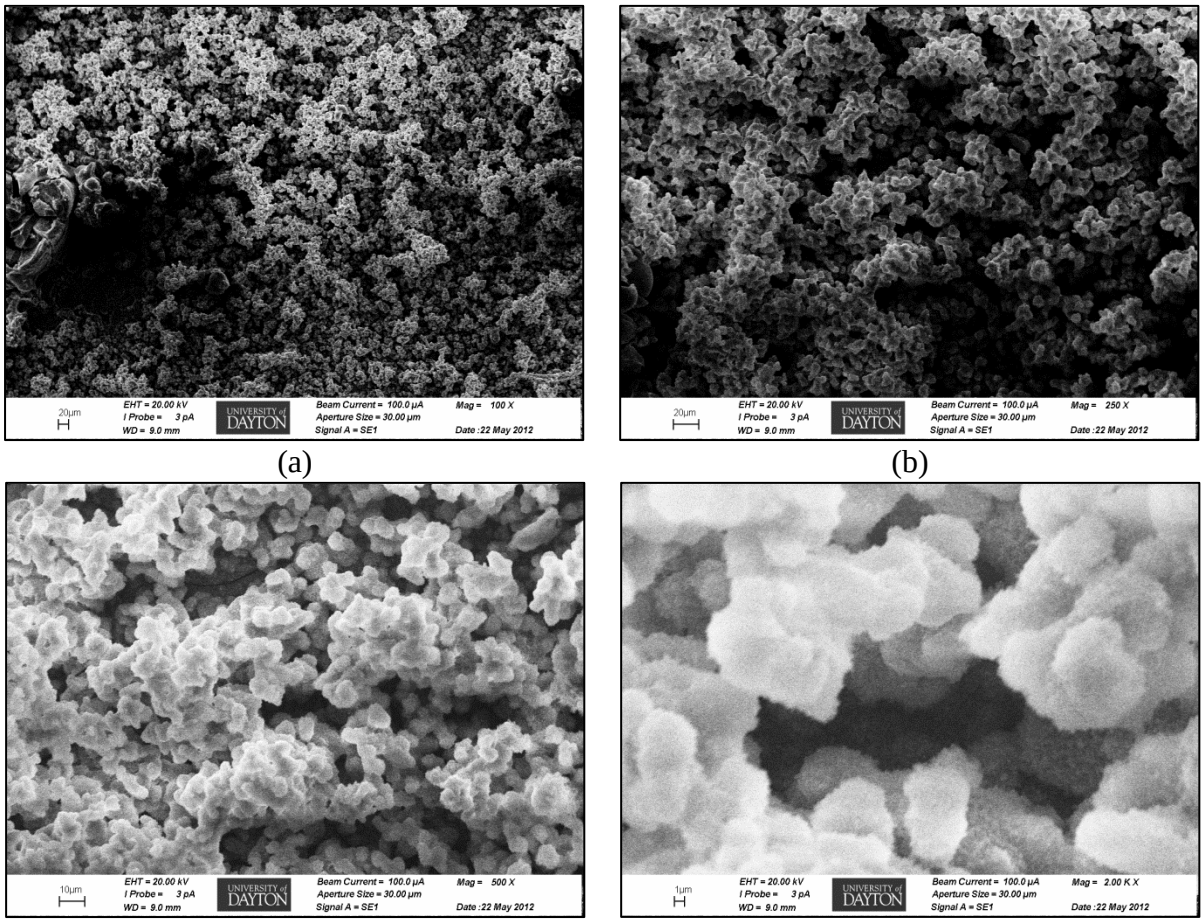


Figure M-17. SEM images of aluminum alloy 7075 sample retrieved on 400 hours exposure from high UV (0.86 W/m2) and high Ozone (800 ppb) chamber. (a) 100X magnification (b) 250X magnification, (c) 500X magnification and (d) 2000X magnification

Distribution Statement A. Approved for Public Release.

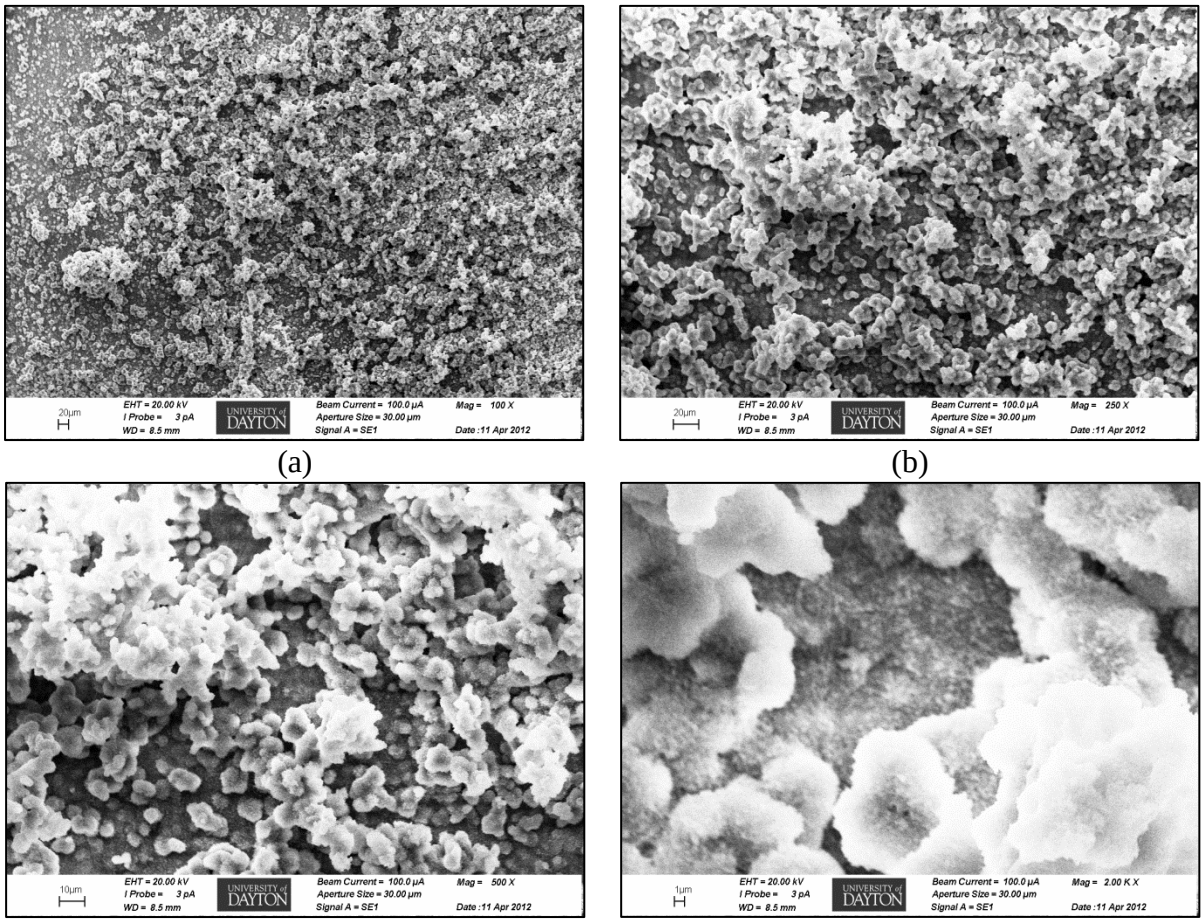


Figure M-18. SEM images of aluminum alloy 7075 sample retrieved on 300 hours exposure from high UV (0.86 W/m2) and high Ozone (800 ppb) chamber. (a) 100X magnification (b) 250X magnification, (c) 500X magnification, and (d) 2000X magnification.

Distribution Statement A. Approved for Public Release.

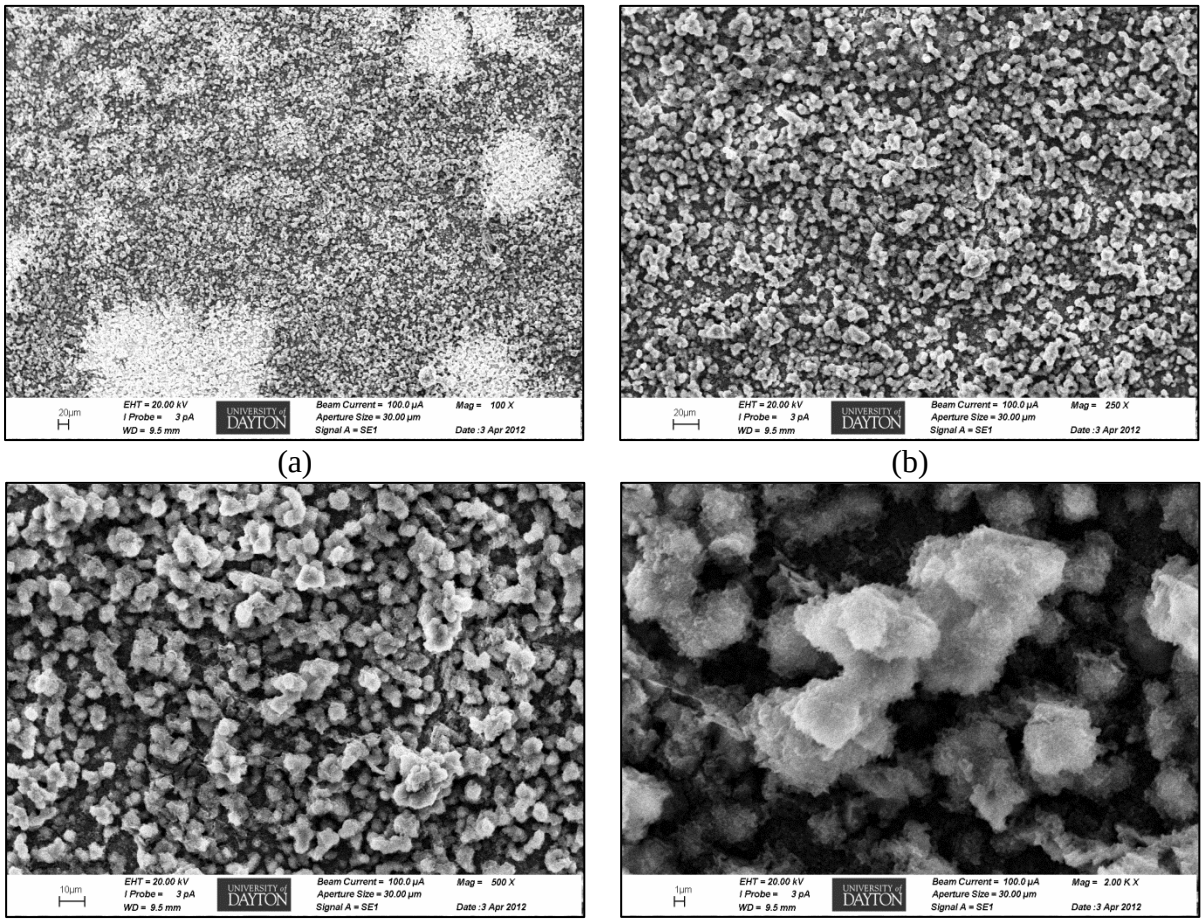
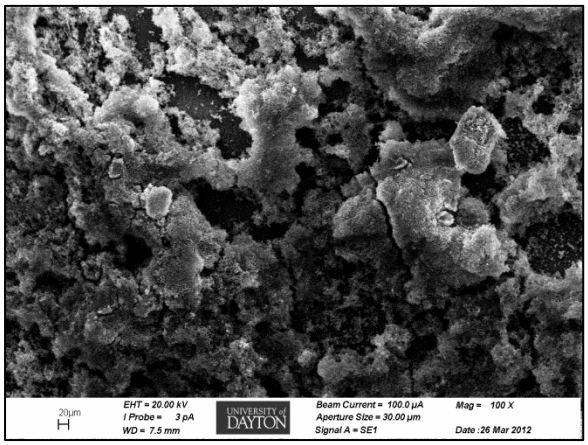
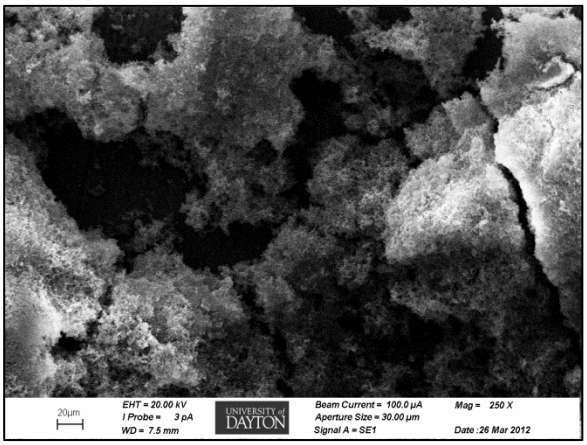


Figure M-19. SEM images of aluminum alloy 7075 sample retrieved on 200 hours exposure from high UV (0.86 W/m2) and high Ozone (800 ppb) chamber. (a) 100X magnification (b) 250X magnification, (c) 500X magnification and (d) 2000X magnification

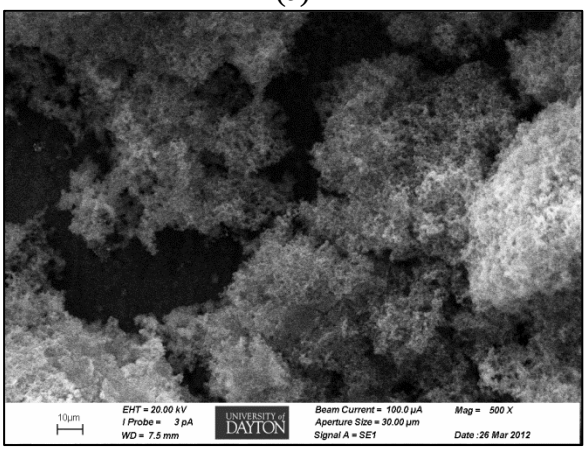
Distribution Statement A. Approved for Public Release.



(a)



(b)



(c)

Figure M-20. SEM images of aluminum alloy 7075 sample retrieved on 100 hours exposure from high UV (0.86 W/m2) and high Ozone (800 ppb) chamber. (a) 100X magnification (b) 250X magnification, and (c) 500X magnification.

Distribution Statement A. Approved for Public Release.

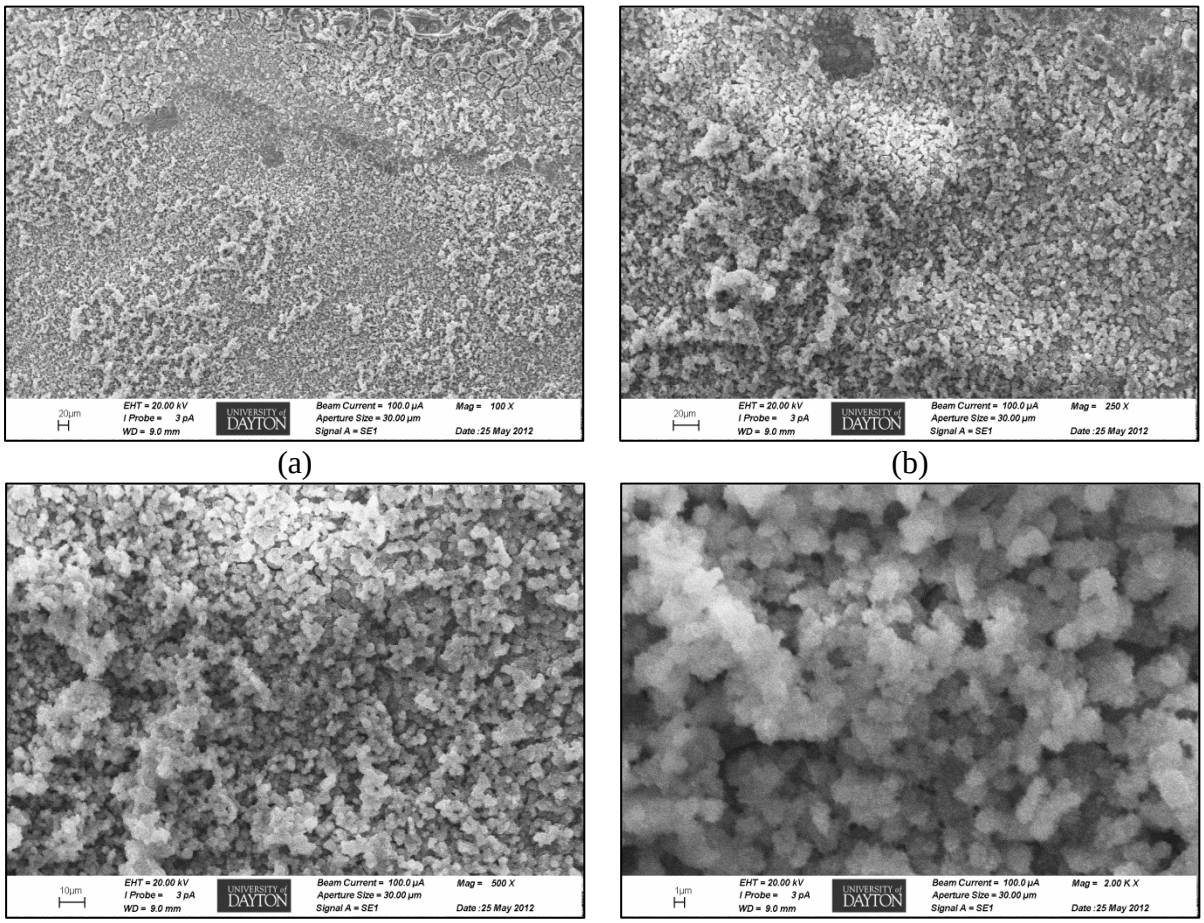


Figure M-21. SEM images of aluminum alloy 6061 sample retrieved on 1000 hours exposure from high UV (0.86 W/m2) and high Ozone (800 ppb) chamber. (a) 100X magnification (b) 250X magnification, (c) 500X magnification, and (d) 2000X magnification.

Distribution Statement A. Approved for Public Release.

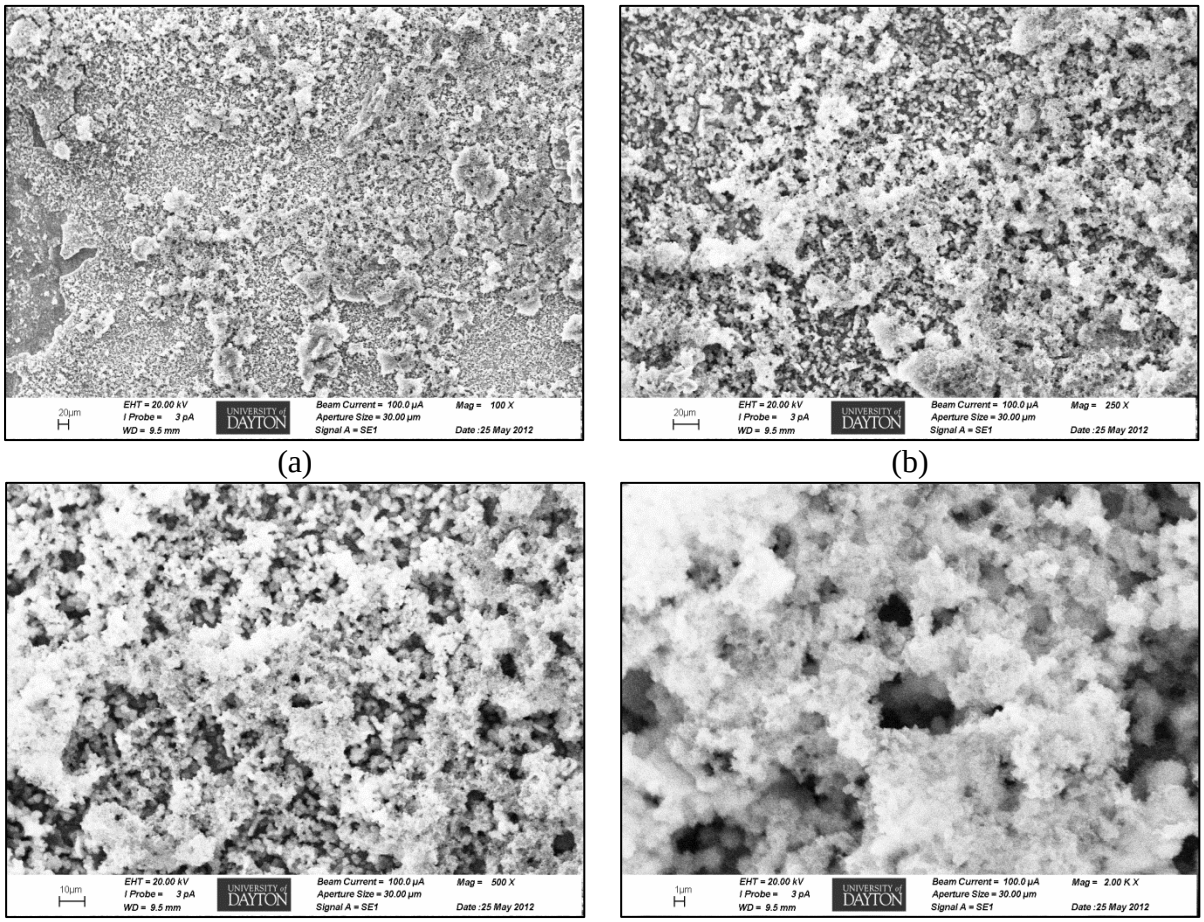


Figure M-22. SEM images of aluminum alloy 6061 sample retrieved on 900 hours exposure from high UV (0.86 W/m2) and high Ozone (800 ppb) chamber. (a) 100X magnification (b) 250X magnification, (c) 500X magnification, and (d) 2000X magnification

.

Distribution Statement A. Approved for Public Release.

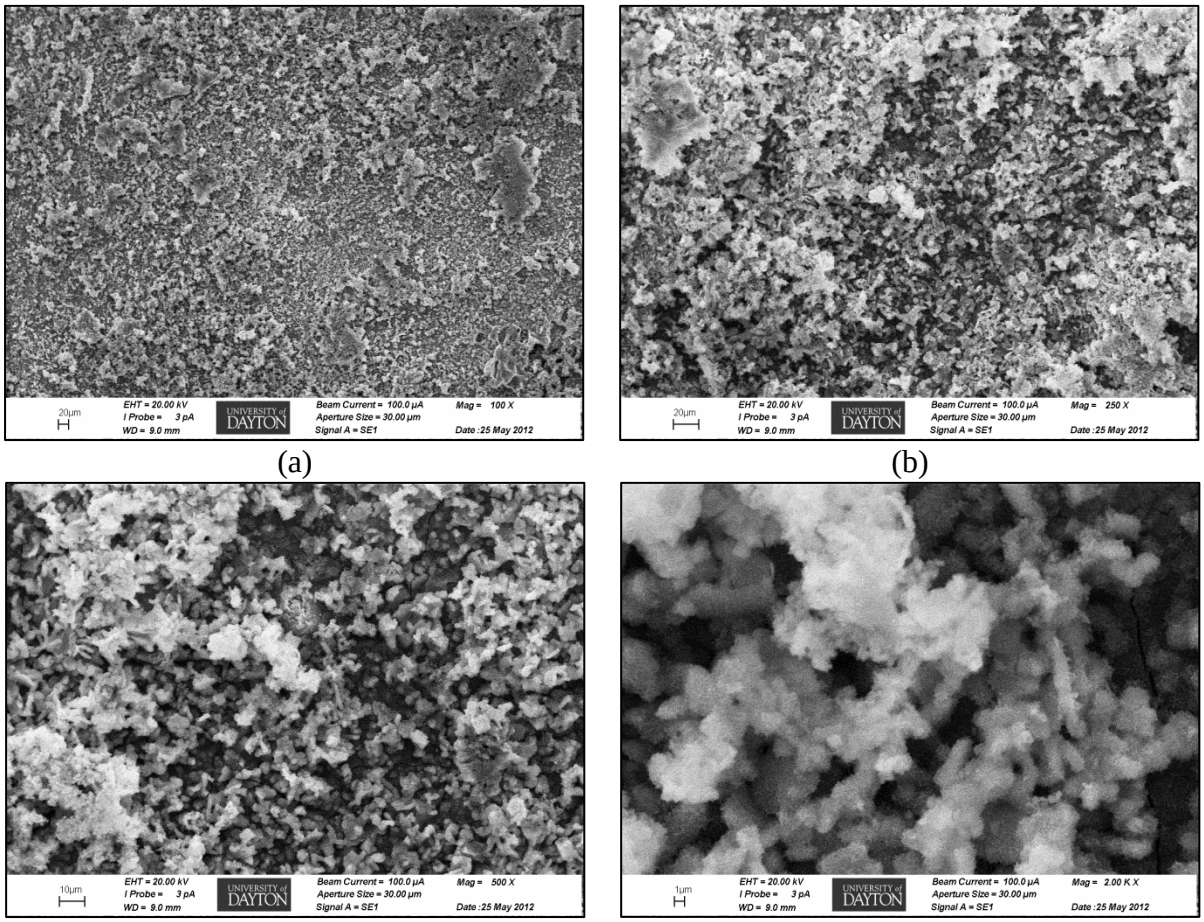
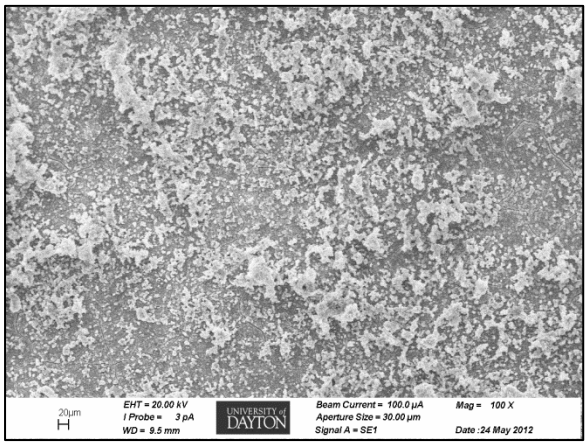
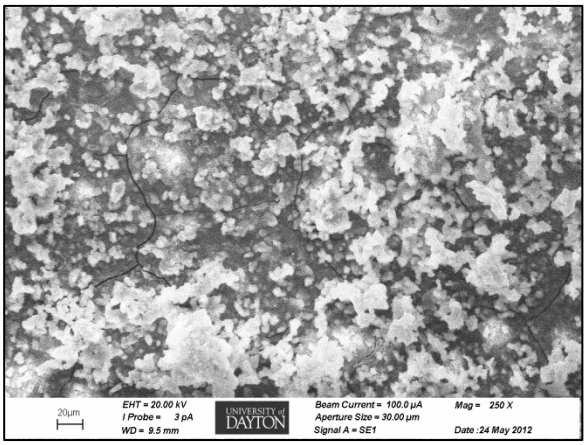


Figure M-23. SEM images of aluminum alloy 6061 sample retrieved on 800 hours exposure from high UV (0.86 W/m2) and high Ozone (800 ppb) chamber. (a) 100X magnification (b) 250X magnification, (c) 500X magnification, and (d) 2000X magnification

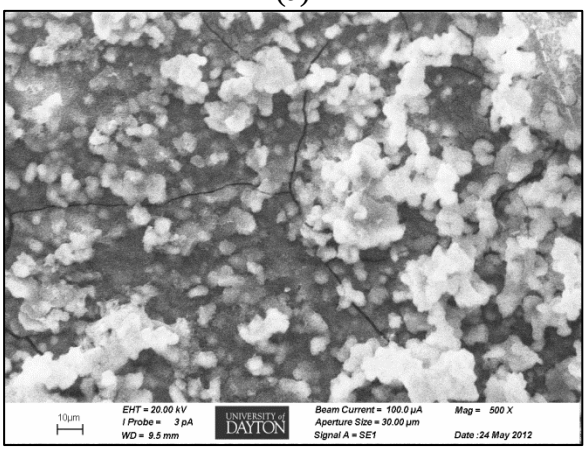
Distribution Statement A. Approved for Public Release.



(a)



(b)



(c)

Figure M-24. SEM images of aluminum alloy 6061 sample retrieved on 700 hours exposure from high UV (0.86 W/m2) and high Ozone (800 ppb) chamber. (a) 100X magnification (b) 250X magnification, and (c) 500X magnification.

Distribution Statement A. Approved for Public Release.

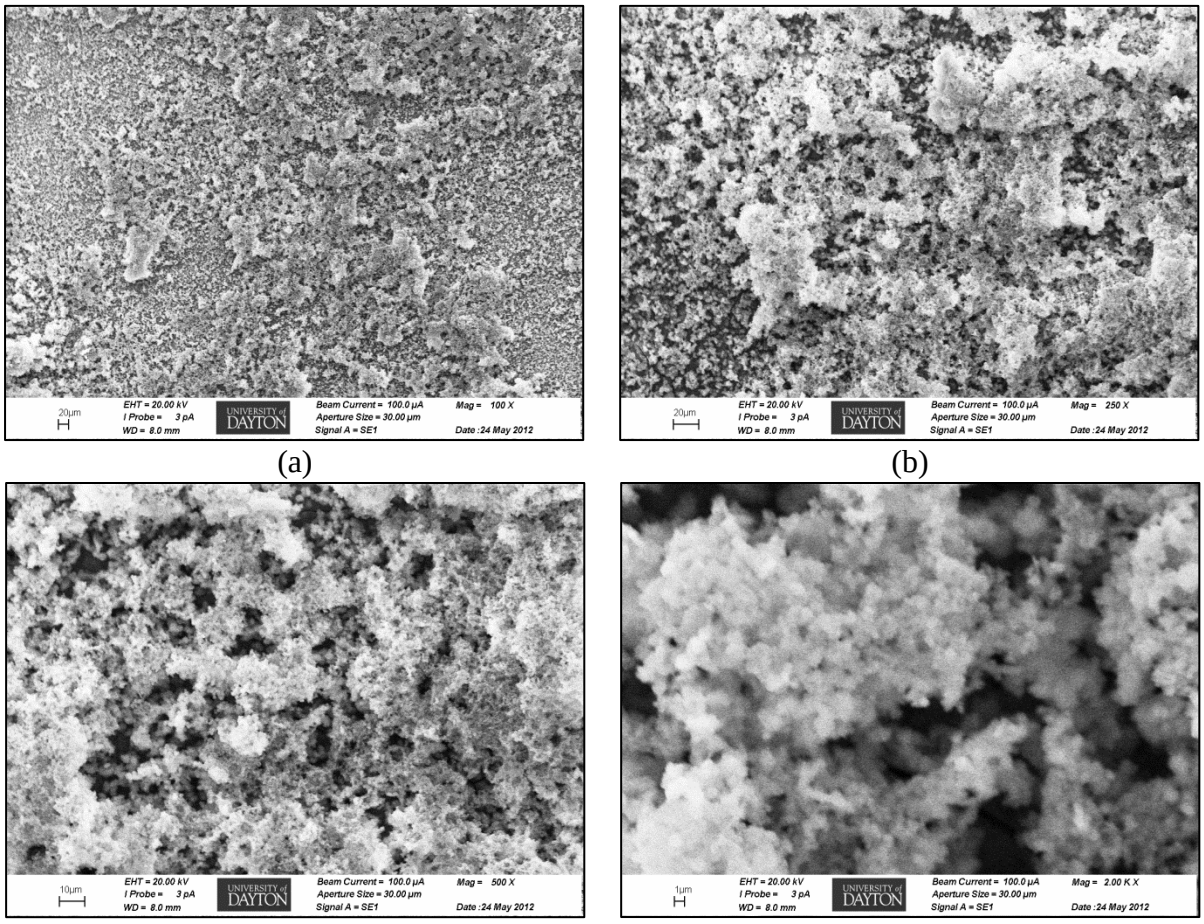


Figure M-25. SEM images of aluminum alloy 6061 sample retrieved on 600 hours exposure from high UV (0.86 W/m2) and high Ozone (800 ppb) chamber. (a) 100X magnification (b) 250X magnification, (c) 500X magnification, and (d) 2000X magnification.

Distribution Statement A. Approved for Public Release.

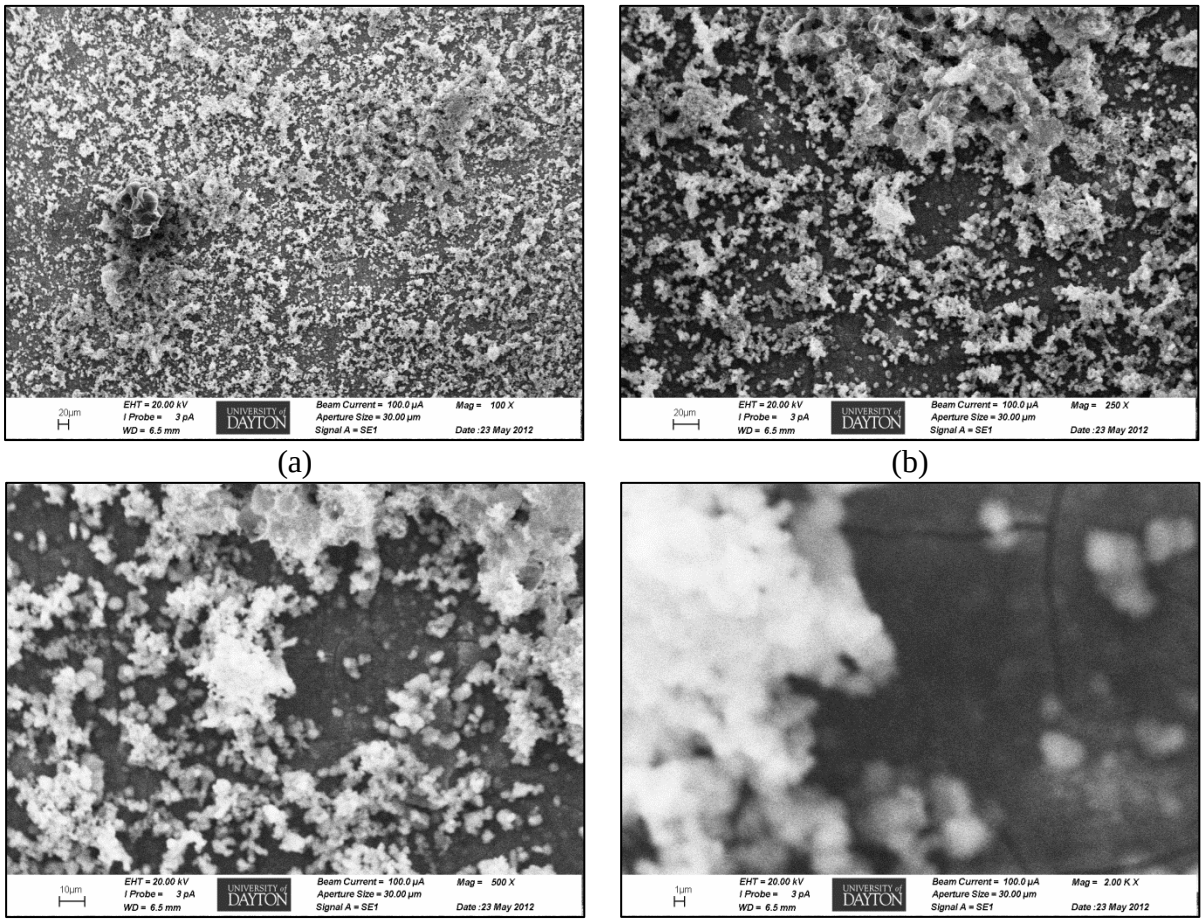


Figure M-26. SEM images of aluminum alloy 6061 sample retrieved on 500 hours exposure from high UV (0.86 W/m2) and high Ozone (800 ppb) chamber. (a) 100X magnification (b) 250X magnification, (c) 500X magnification, and (d) 2000X magnification.

Distribution Statement A. Approved for Public Release.

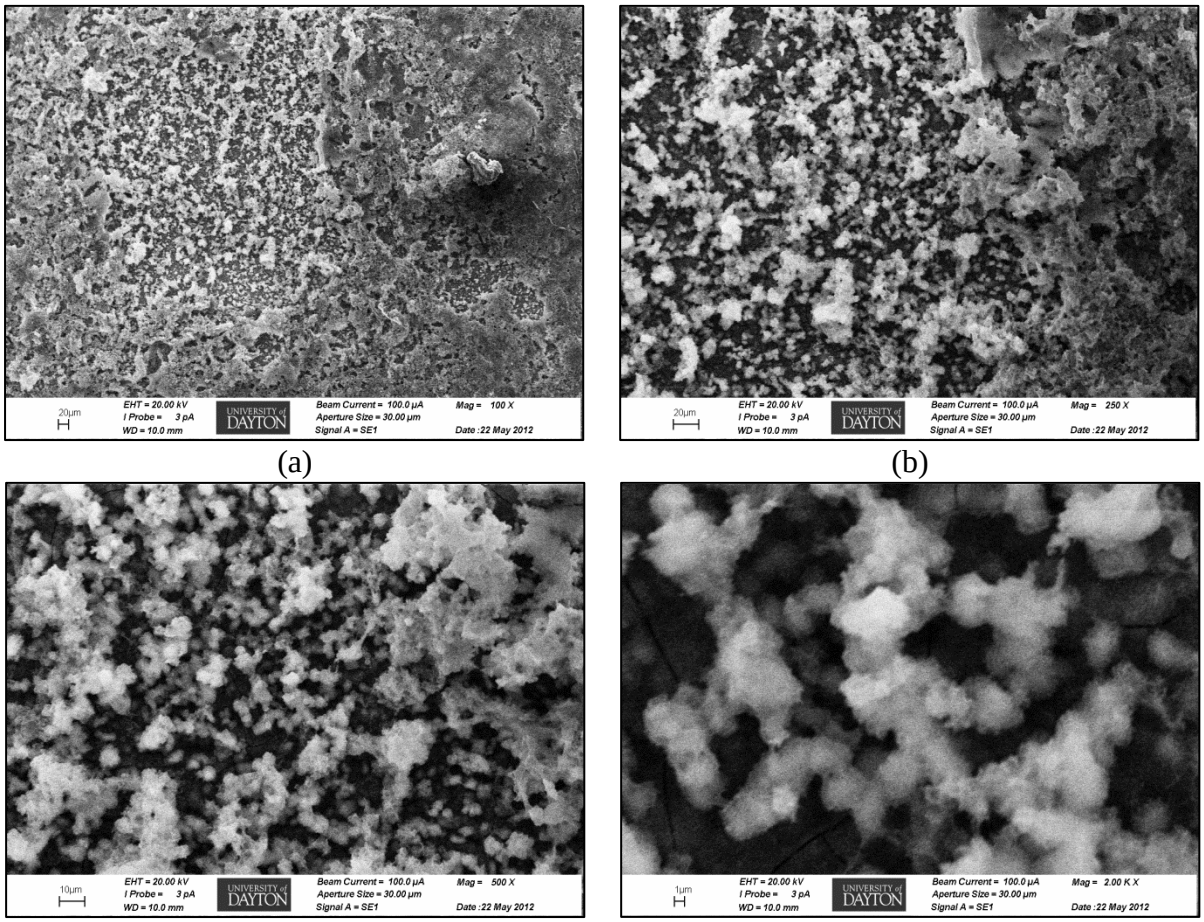
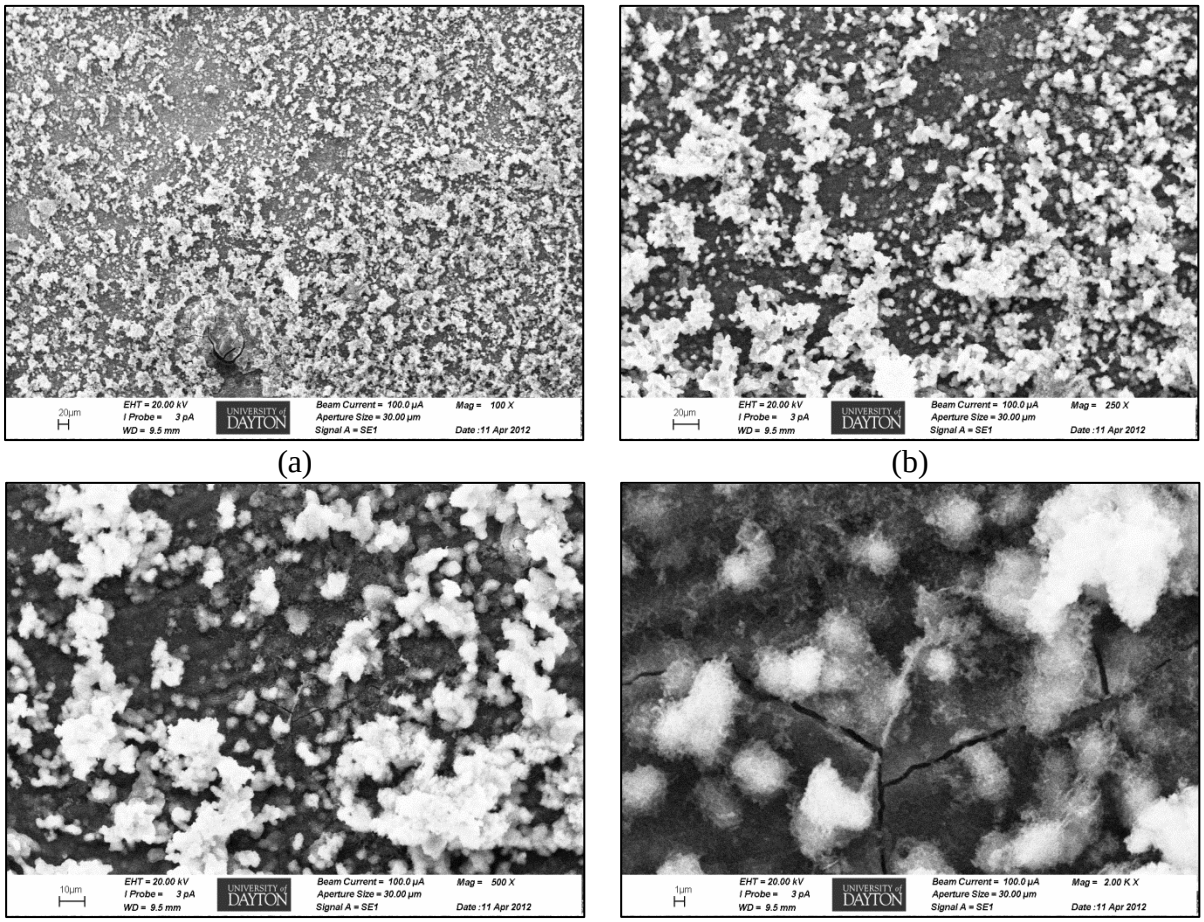


Figure M-27. SEM images of aluminum alloy 6061 sample retrieved on 400 hours exposure from high UV (0.86 W/m2) and high Ozone (800 ppb) chamber. (a) 100X magnification (b) 250X magnification, (c) 500X magnification , and (d) 2000X magnification.

.

Distribution Statement A. Approved for Public Release.

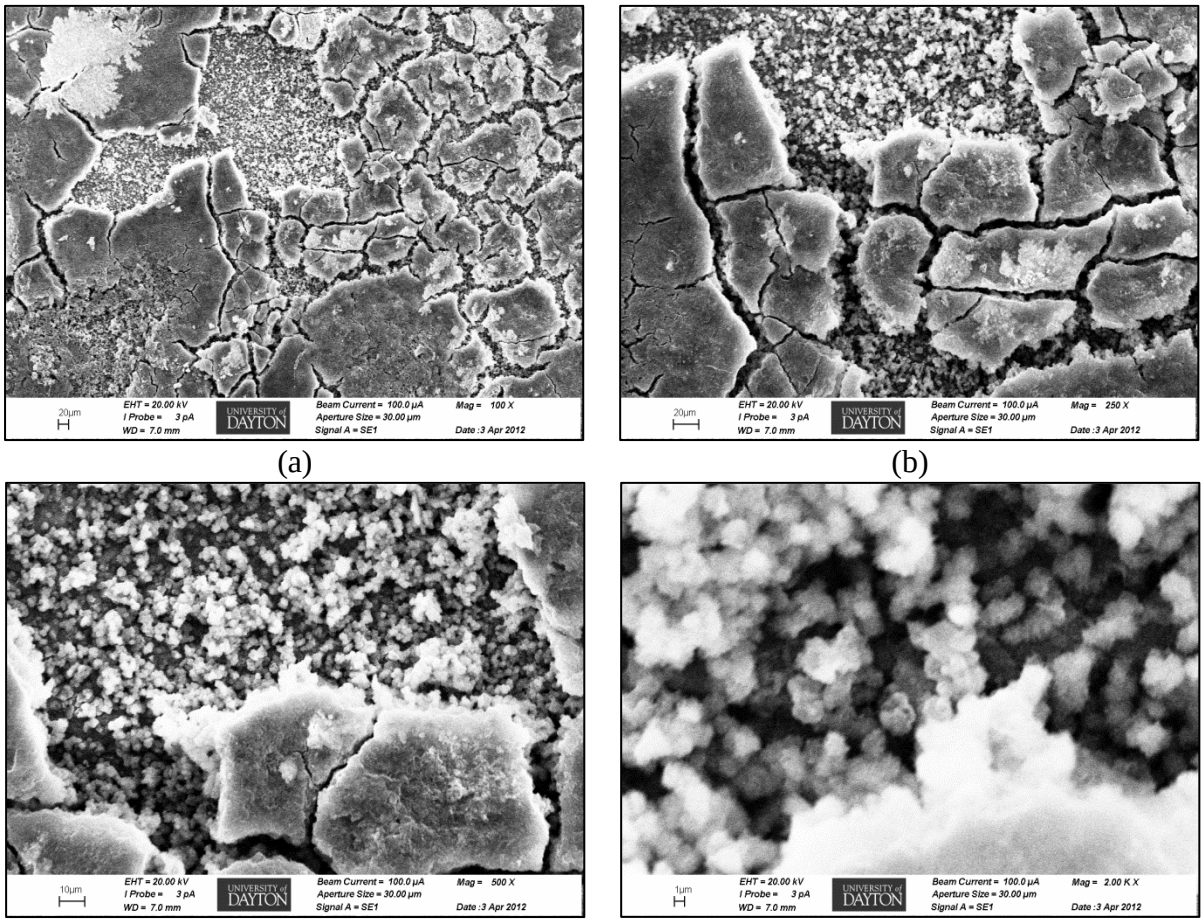


(a) (b)

(c) (d)

Figure M-28. SEM images of aluminum alloy 6061 sample retrieved on 300 hours exposure from high UV (0.86 W/m2) and high Ozone (800 ppb) chamber. (a) 100X magnification (b) 250X magnification, (c) 500X magnification, and (d) 2000X magnification.

Distribution Statement A. Approved for Public Release.



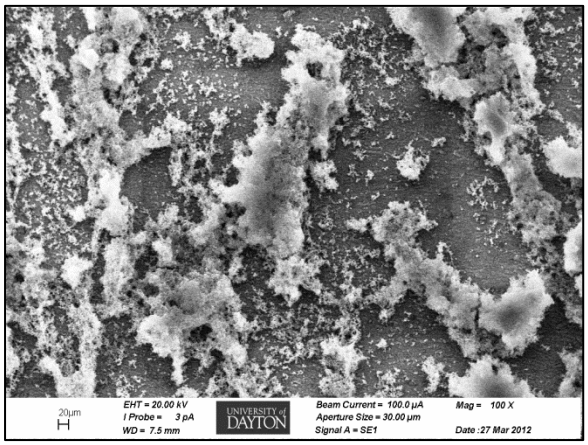
(a) (b)

(c) (d)

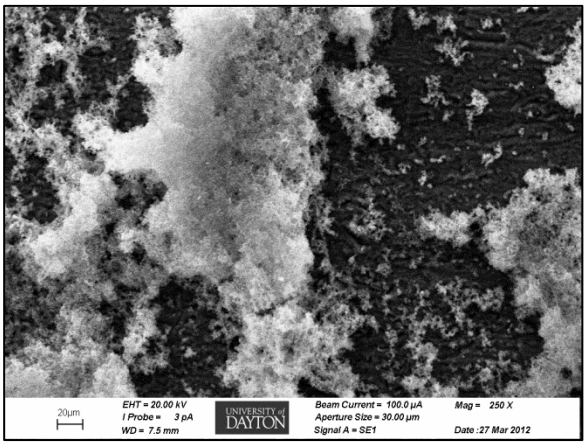
Figure M-29. SEM images of aluminum alloy 6061 sample retrieved on 200 hours exposure from high UV (0.86 W/m2) and high Ozone (800 ppb) chamber. (a) 100X magnification (b) 250X magnification, (c) 500X magnification , and (d) 2000X magnification.

.

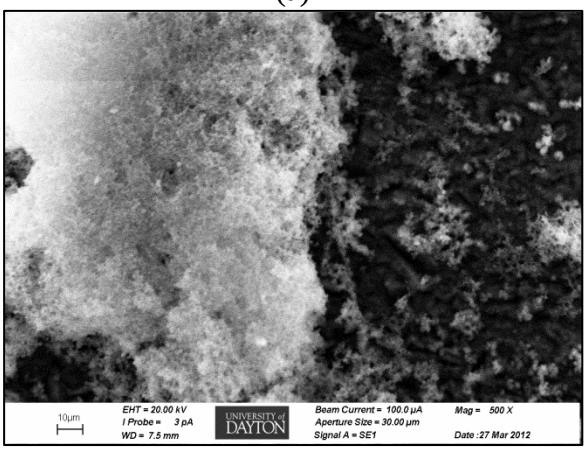
Distribution Statement A. Approved for Public Release.



(a)



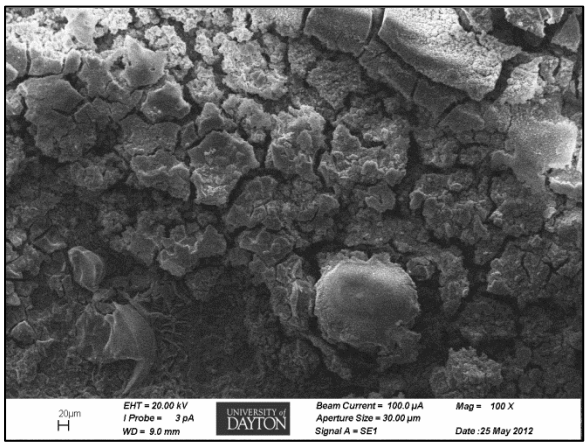
(b)



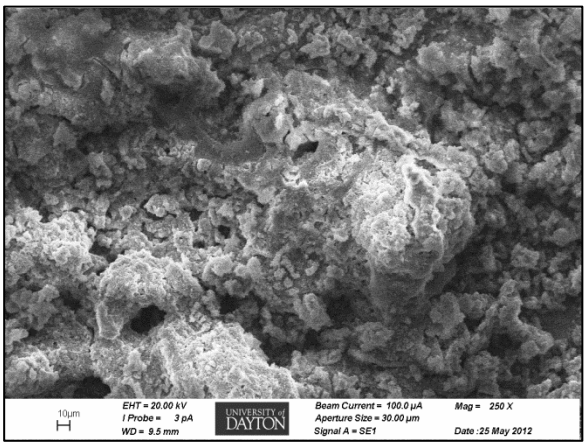
(c)

Figure M-30. SEM images of aluminum alloy 6061 sample retrieved on 100 hours exposure from high UV (0.86 W/m2) and high Ozone (800 ppb) chamber. (a) 100X magnification (b) 250X magnification, and (c) 500X magnification.

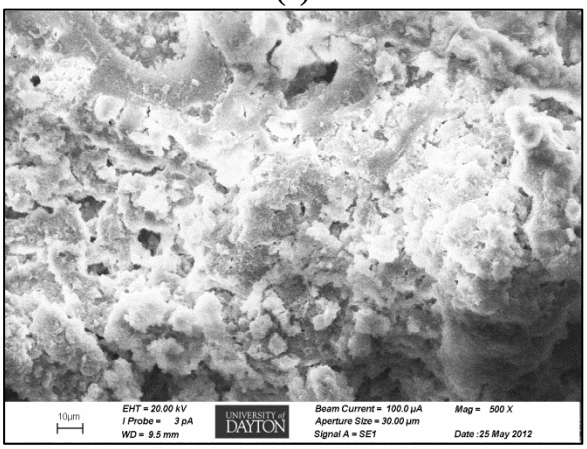
Distribution Statement A. Approved for Public Release.



(a)



(b)

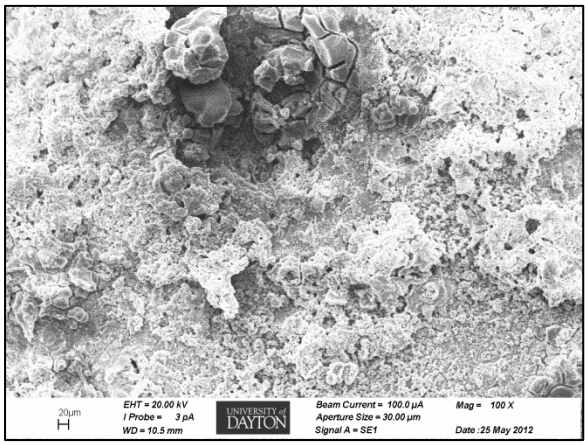


(c)

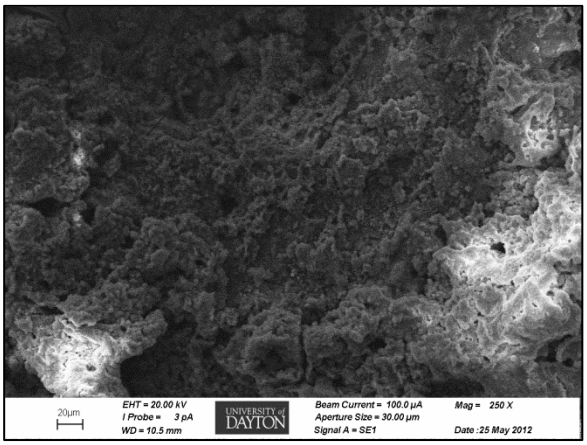
Figure M-31. SEM images of aluminum alloy 2024 sample retrieved on 1000 hours exposure from high UV (0.86 W/m2) and high Ozone (800 ppb) chamber. (a) 100X magnification (b) 250X magnification, and (c) 500X magnification.

.

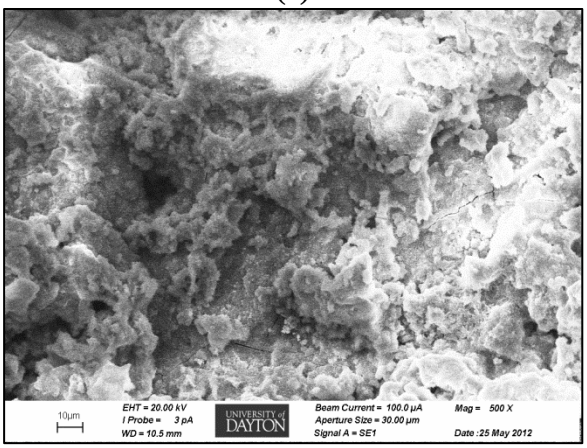
Distribution Statement A. Approved for Public Release.



(a)



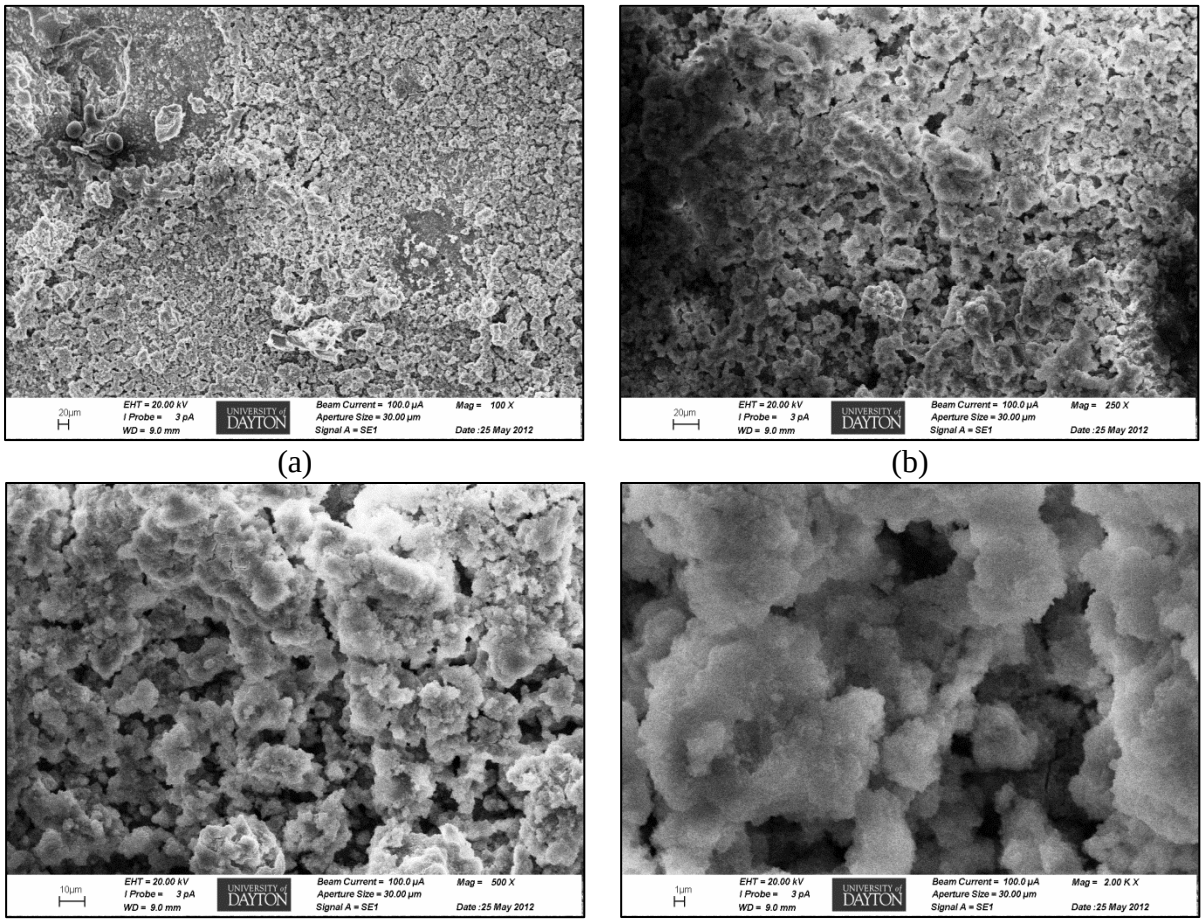
(b)



(c)

Figure M-32. SEM images of aluminum alloy 2024 sample retrieved on 900 hours exposure from high UV (0.86 W/m2) and high Ozone (800 ppb) chamber. (a) 100X magnification (b) 250X magnification, and (c) 500X magnification.

Distribution Statement A. Approved for Public Release.

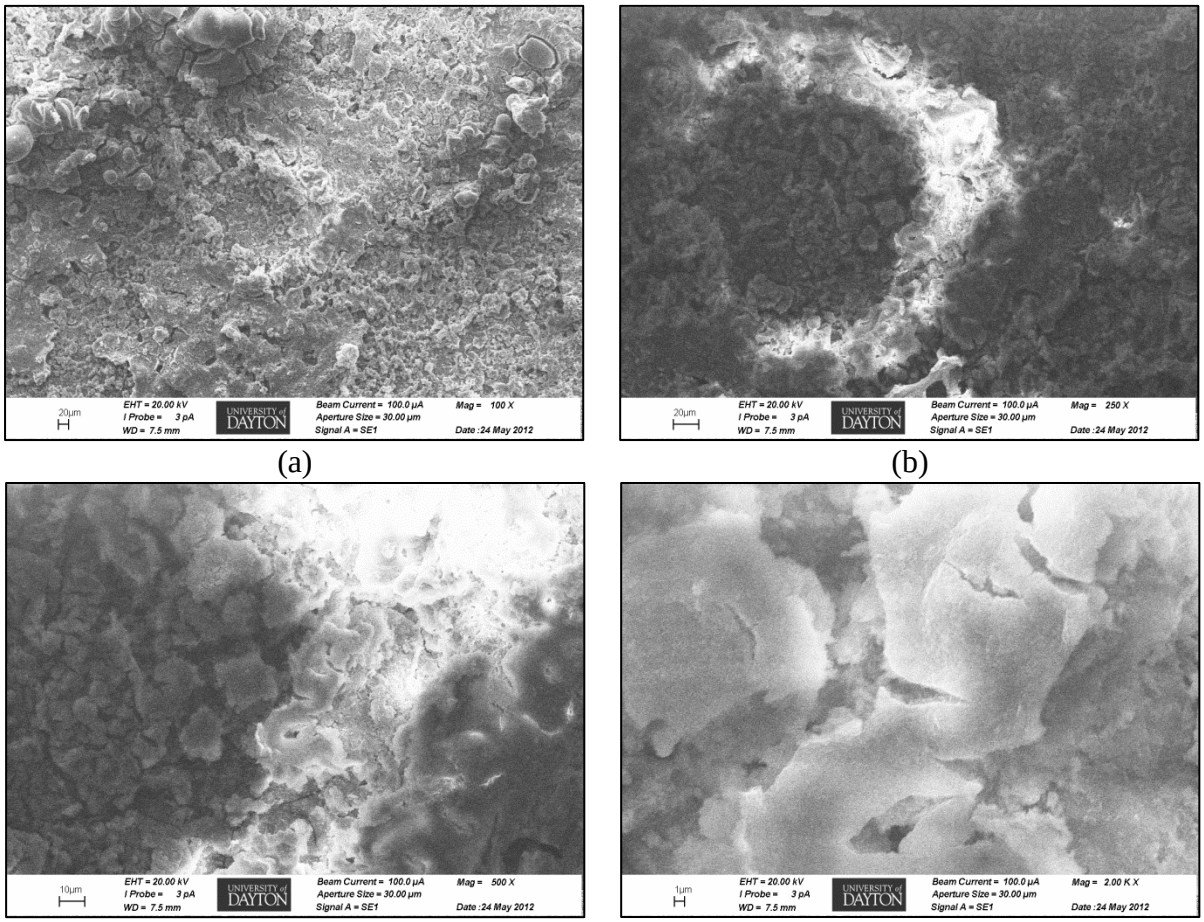


(a) (b)

(c) (d)

Figure M-33. SEM images of aluminum alloy 2024 sample retrieved on 800 hours exposure from high UV (0.86 W/m2) and high Ozone (800 ppb) chamber. (a) 100X magnification (b) 250X magnification, (c) 500X magnification, and (d) 2000X magnification.

Distribution Statement A. Approved for Public Release.

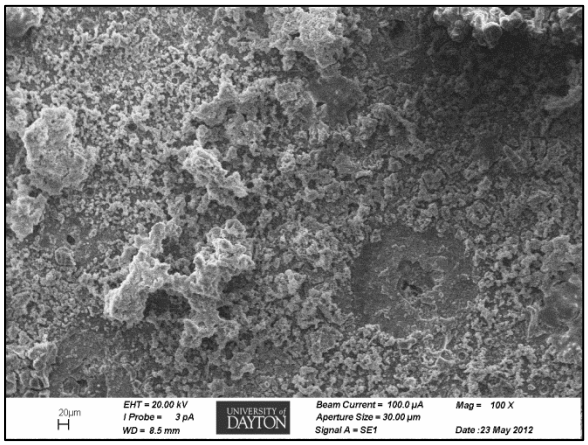


(a) (b)

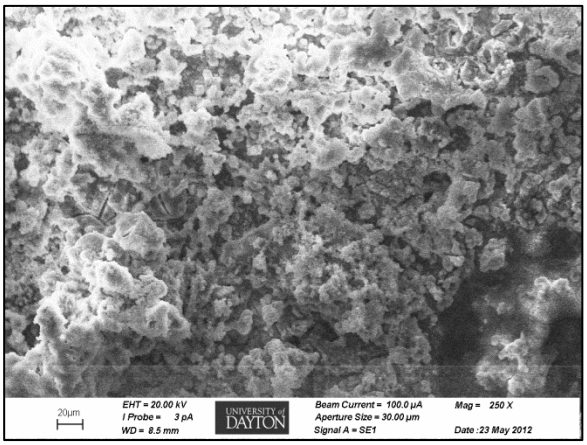
(c) (d)

Figure M-34. SEM images of aluminum alloy 2024 sample retrieved on 700 hours exposure from high UV (0.86 W/m2) and high Ozone (800 ppb) chamber. (a) 100X magnification (b) 250X magnification, (c) 500X magnification, and (d) 2000X magnification.

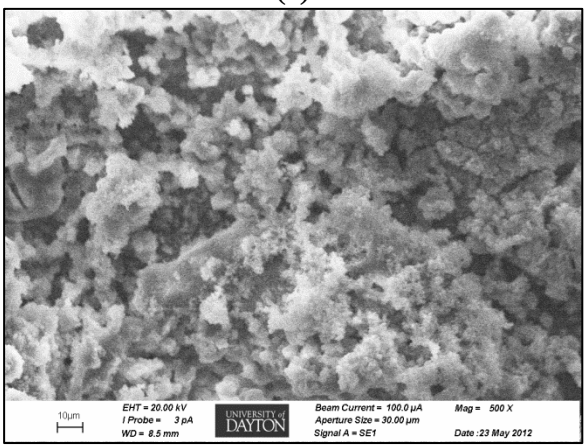
Distribution Statement A. Approved for Public Release.



(a)



(b)



(c)

Figure M-35. SEM images of aluminum alloy 2024 sample retrieved on 600 hours exposure from high UV (0.86 W/m2) and high Ozone (800 ppb) chamber. (a) 100X magnification (b) 250X magnification, and (c) 500X magnification.

Distribution Statement A. Approved for Public Release.

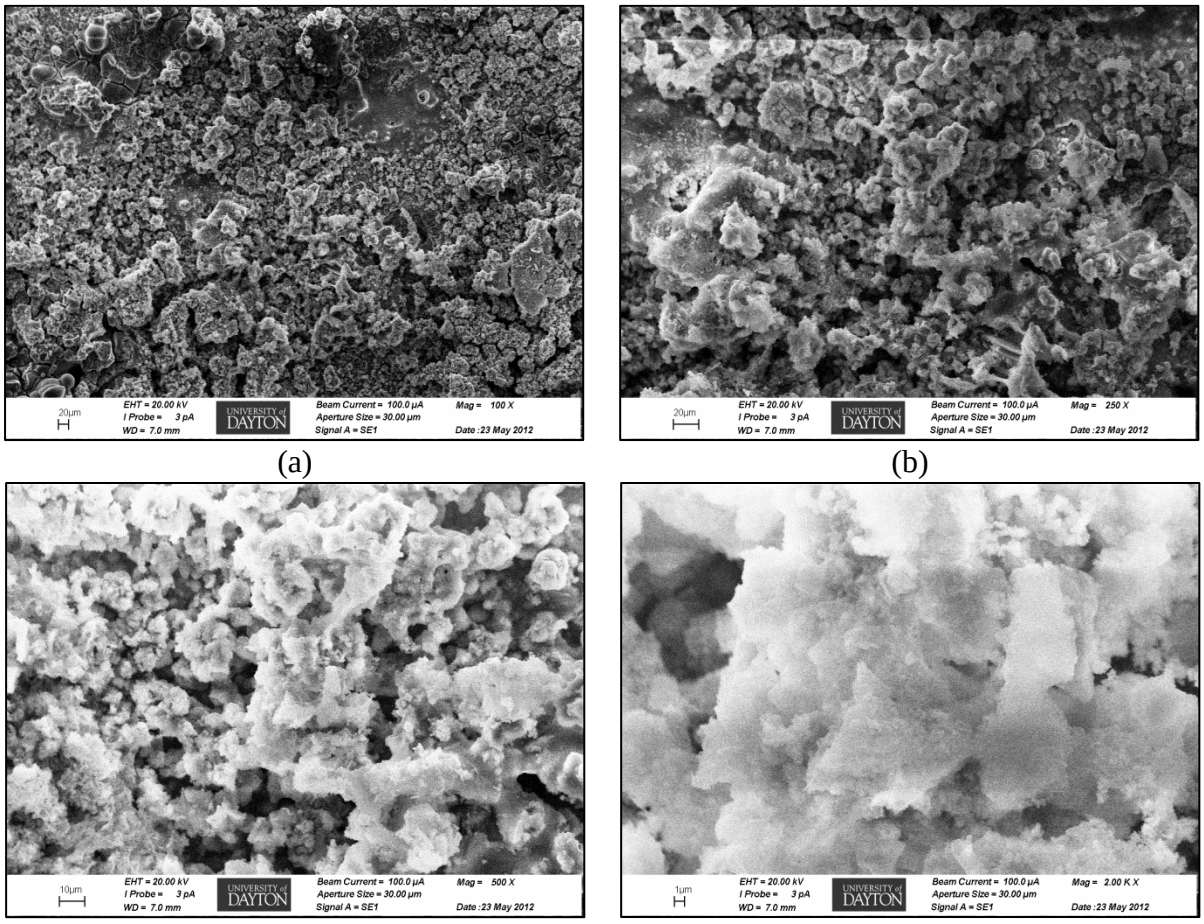


Figure M-36. SEM images of aluminum alloy 2024 sample retrieved on 500 hours exposure from high UV (0.86 W/m2) and high Ozone (800 ppb) chamber. (a) 100X magnification (b) 250X magnification, (c) 500X magnification, and (d) 2000X magnification.

Distribution Statement A. Approved for Public Release.

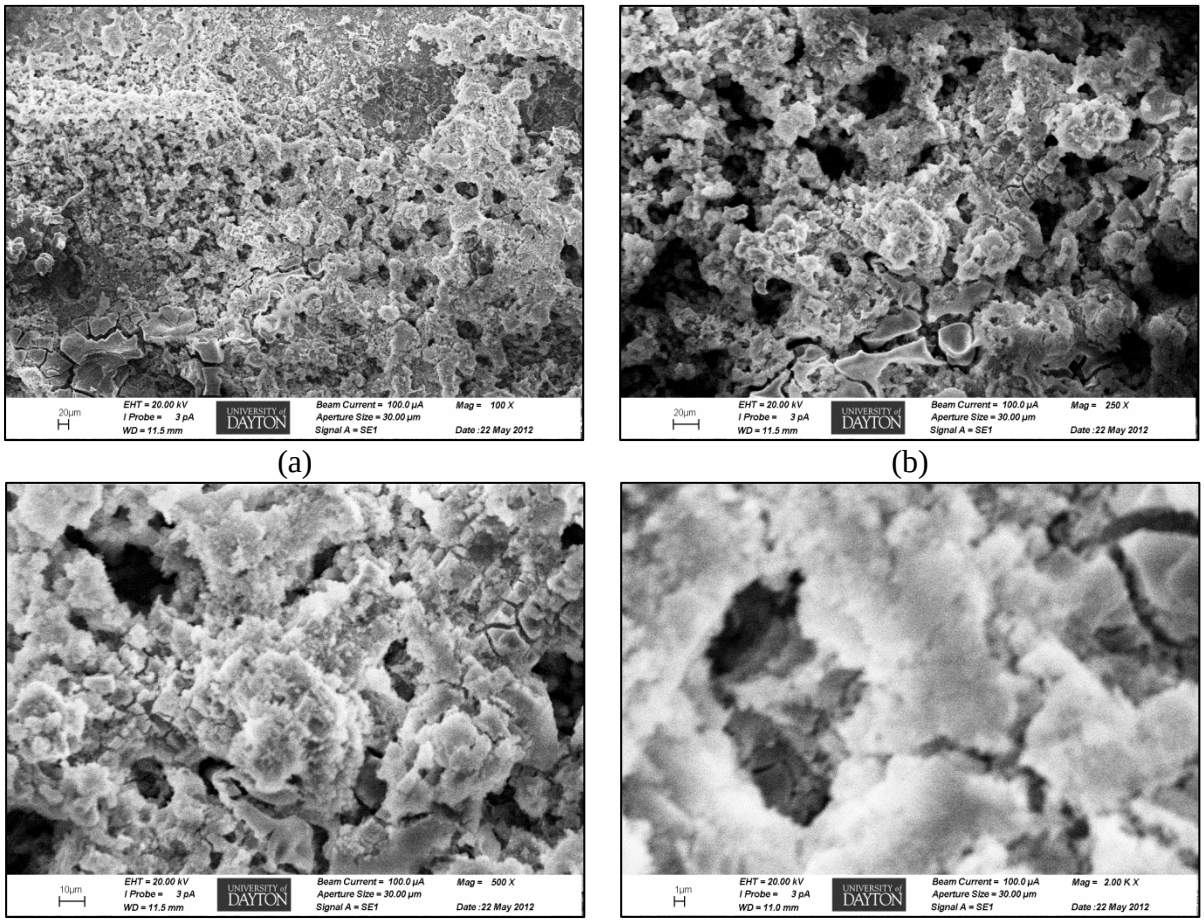


Figure M-37. SEM images of aluminum alloy 2024 sample retrieved on 400 hours exposure from high UV (0.86 W/m2) and high Ozone (800 ppb) chamber. (a) 100X magnification (b) 250X magnification, (c) 500X magnification , and (d) 2000X magnification.

Distribution Statement A. Approved for Public Release.

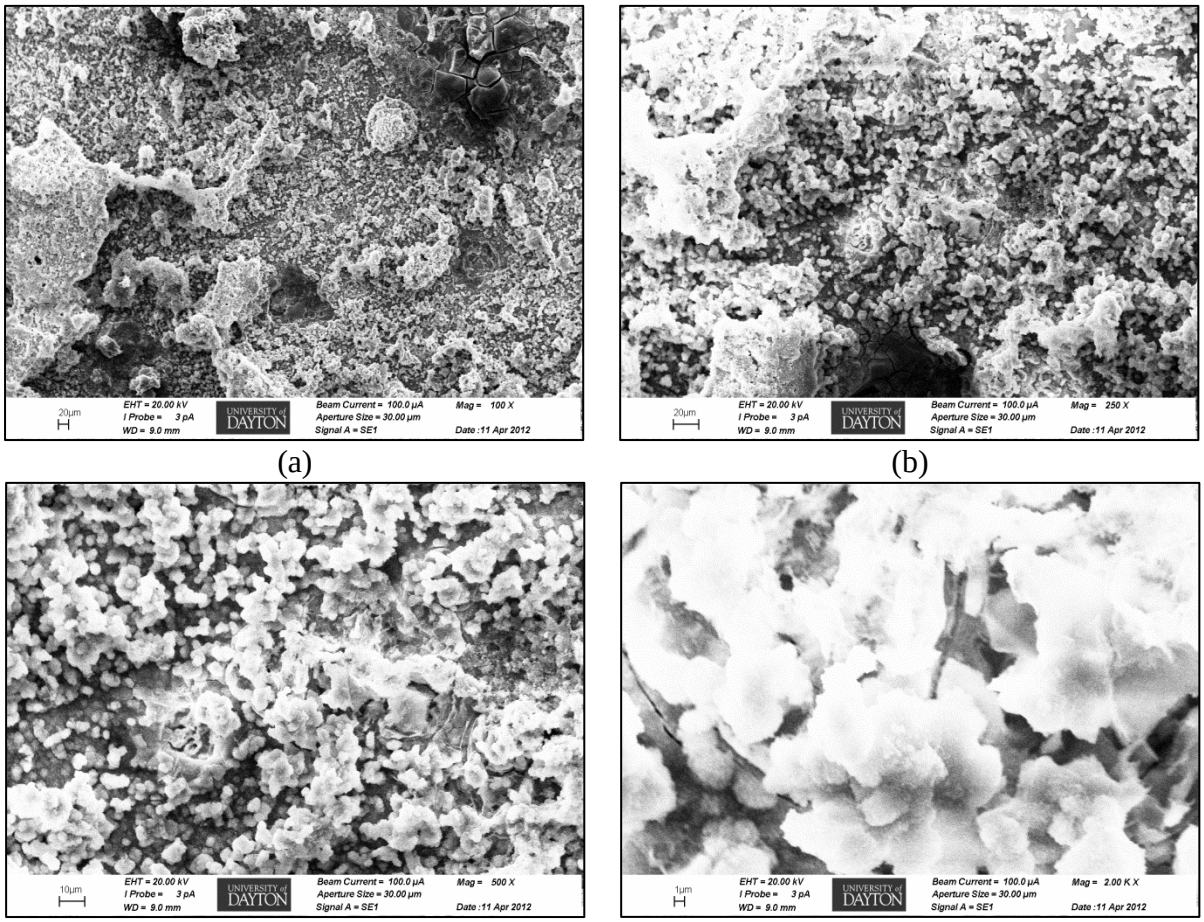


Figure M-38. SEM images of aluminum alloy 2024 sample retrieved on 300 hours exposure from high UV (0.86 W/m2) and high Ozone (800 ppb) chamber. (a) 100X magnification, (b) 250X magnification, (c) 500X magnification, and (d) 2000X magnification.

Distribution Statement A. Approved for Public Release.

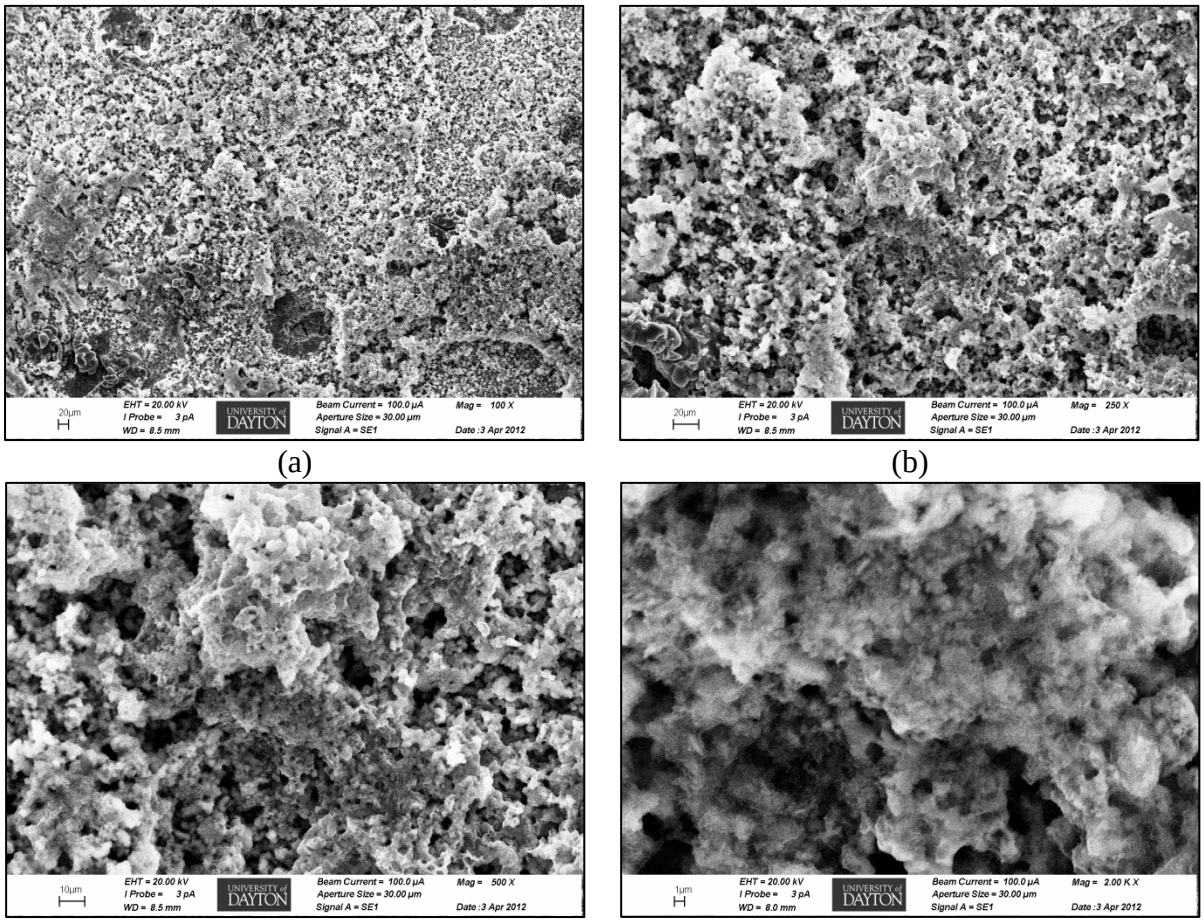
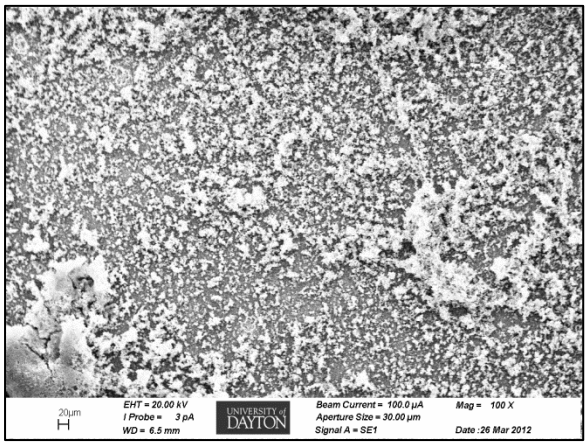
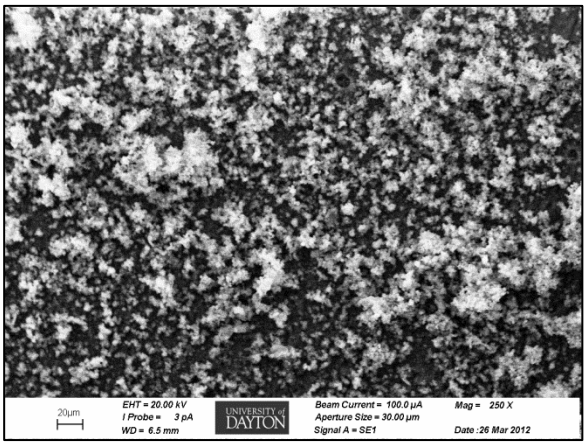


Figure M-39. SEM images of aluminum alloy 2024 sample retrieved on 200 hours exposure from high UV (0.86 W/m2) and high Ozone (800 ppb) chamber. (a) 100X magnification (b) 250X magnification, (c) 500X magnification , and (d) 2000X magnification.

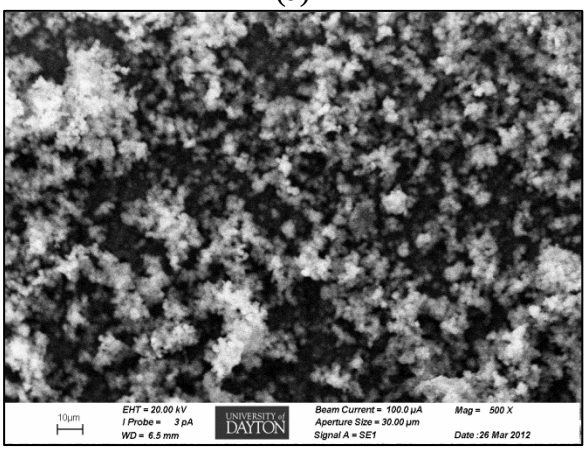
Distribution Statement A. Approved for Public Release.



(a)



(b)



(c)

Figure M-40. SEM images of aluminum alloy 2024 sample retrieved on 100 hours exposure from high UV (0.86 W/m2) and high Ozone (800 ppb) chamber. (a) 100X magnification, (b) 250X magnification, and (c) 500X magnification.

Distribution Statement A. Approved for Public Release.

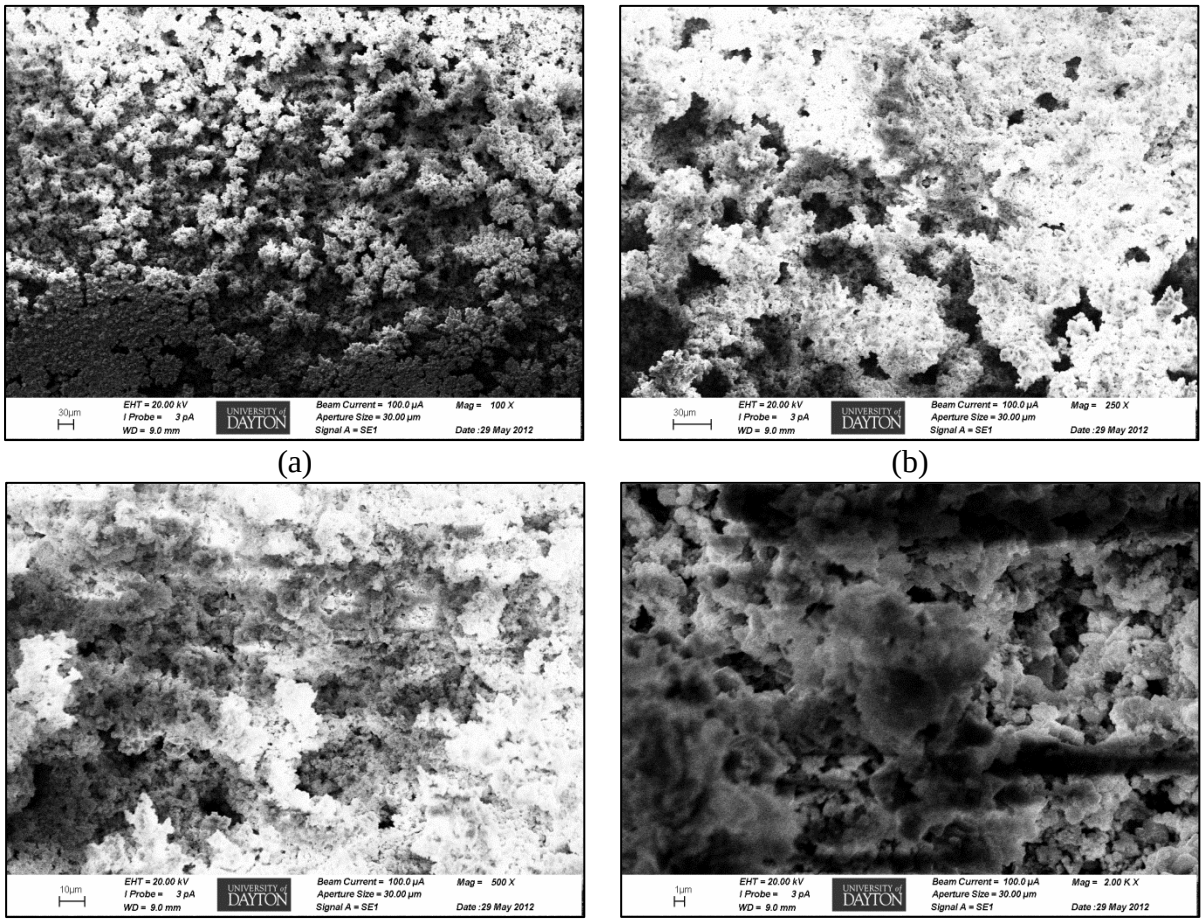


Figure M-41. SEM images of pure copper sample retrieved on 1000 hours exposure from high UV (0.86 W/m2) and high Ozone (800 ppb) chamber. (a) 100X magnification (b) 250X magnification, (c) 500X magnification, and (d) 2000X magnification.

Distribution Statement A. Approved for Public Release.

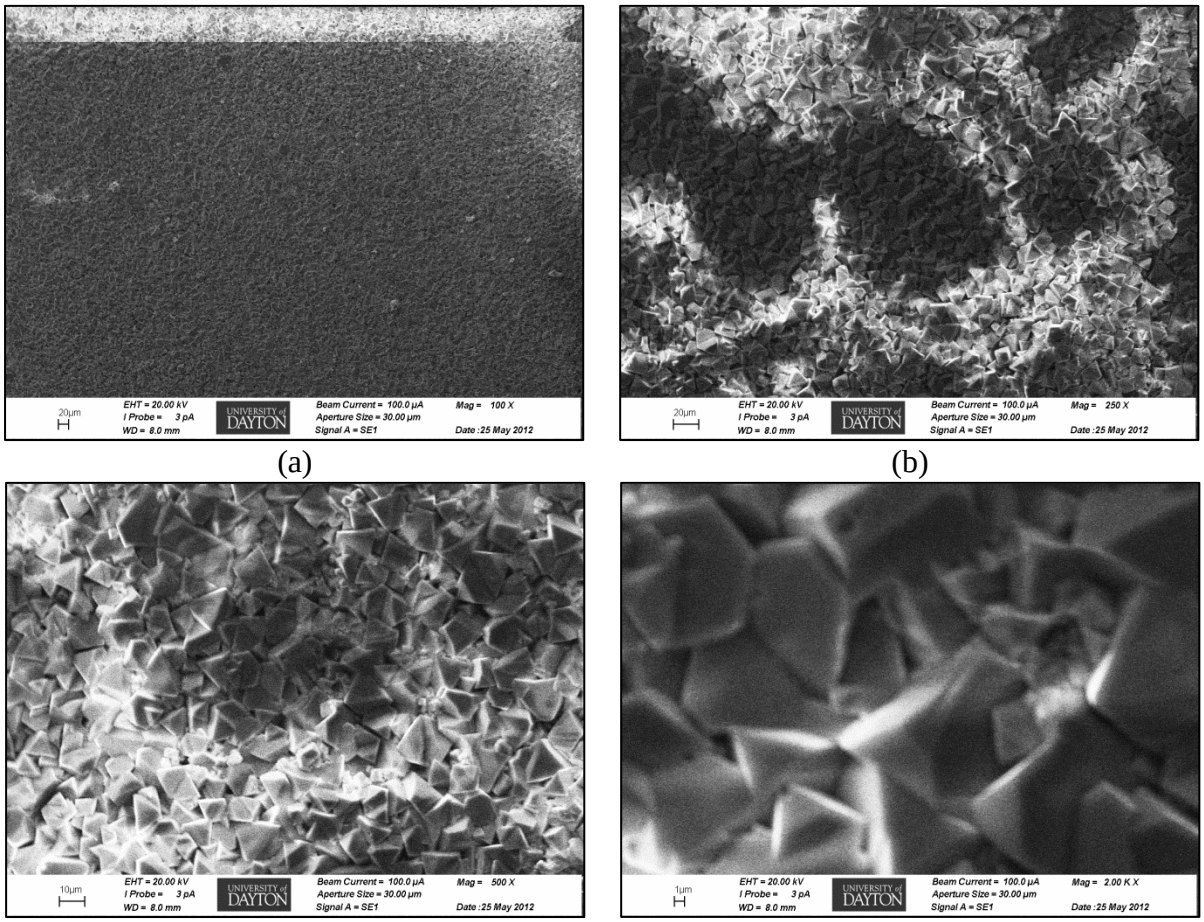


Figure M-42. SEM images of pure copper sample retrieved on 900 hours exposure from high UV (0.86 W/m2) and high Ozone (800 ppb) chamber. (a) 100X magnification (b) 250X magnification, (c) 500X magnification, and (d) 2000X magnification.

Distribution Statement A. Approved for Public Release.

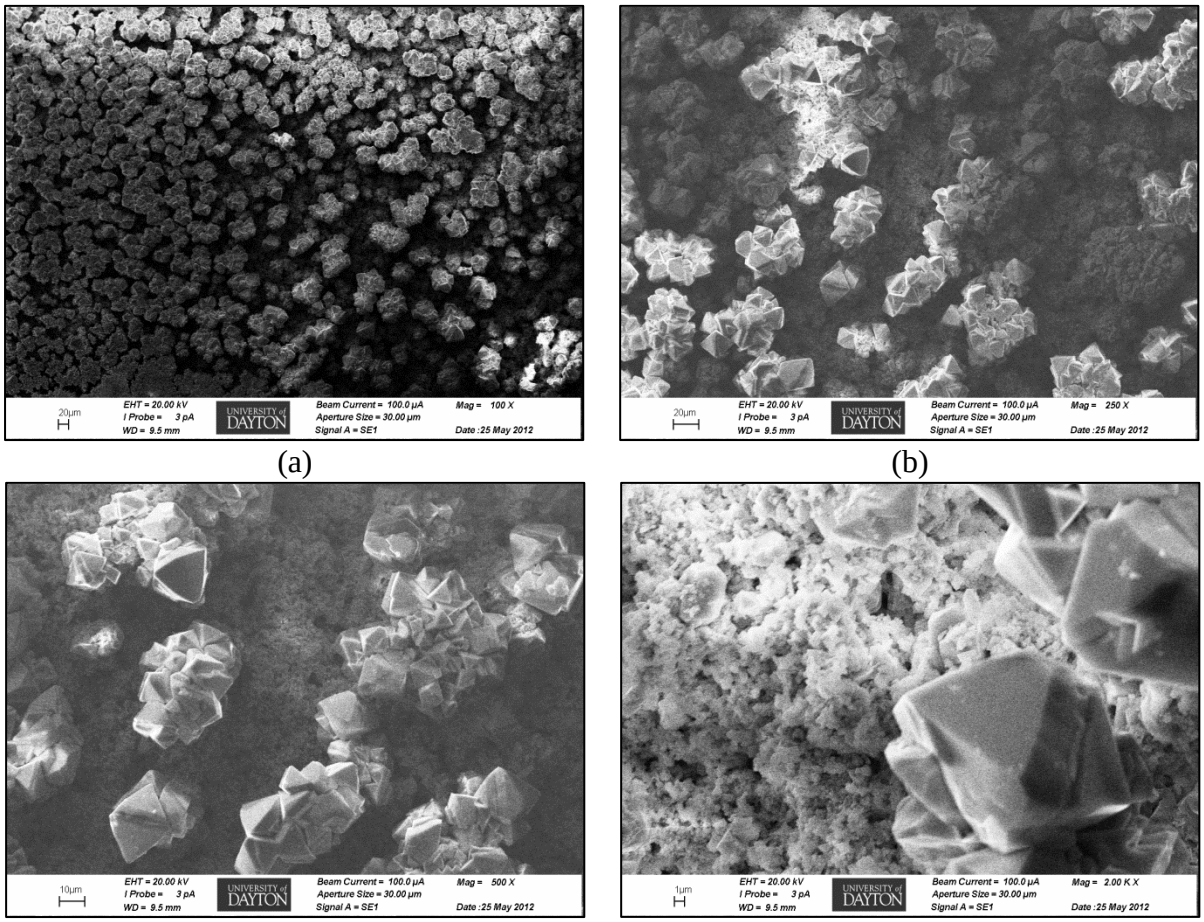


Figure M-43. SEM images of pure copper sample retrieved on 800 hours exposure from high UV (0.86 W/m2) and high Ozone (800 ppb) chamber. (a) 100X magnification (b) 250X magnification, (c) 500X magnification, and (d) 2000X magnification.

Distribution Statement A. Approved for Public Release.

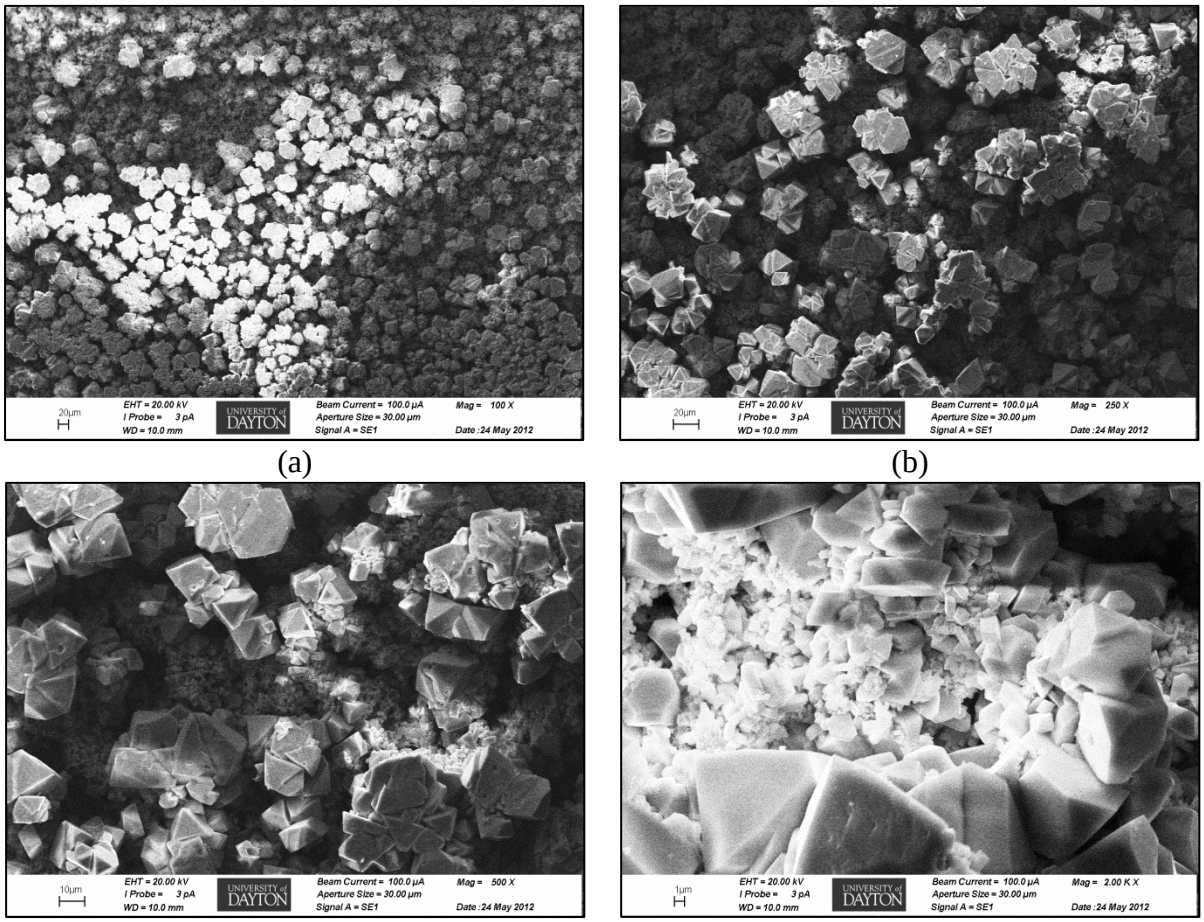


Figure M-44. SEM images of pure copper sample retrieved on 700 hours exposure from high UV (0.86 W/m2) and high Ozone (800 ppb) chamber. (a) 100X magnification (b) 250X magnification, (c) 500X magnification, and (d) 2000X magnification.

Distribution Statement A. Approved for Public Release.

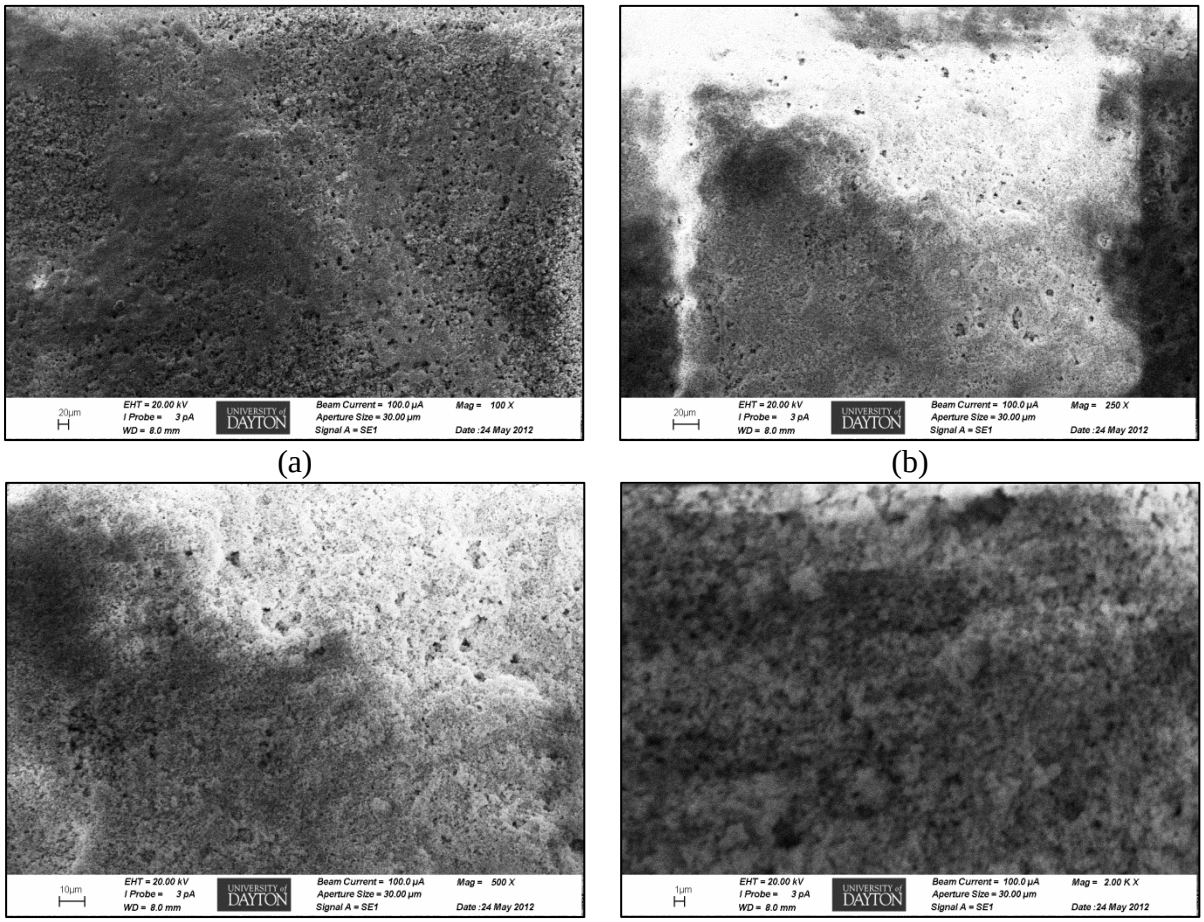
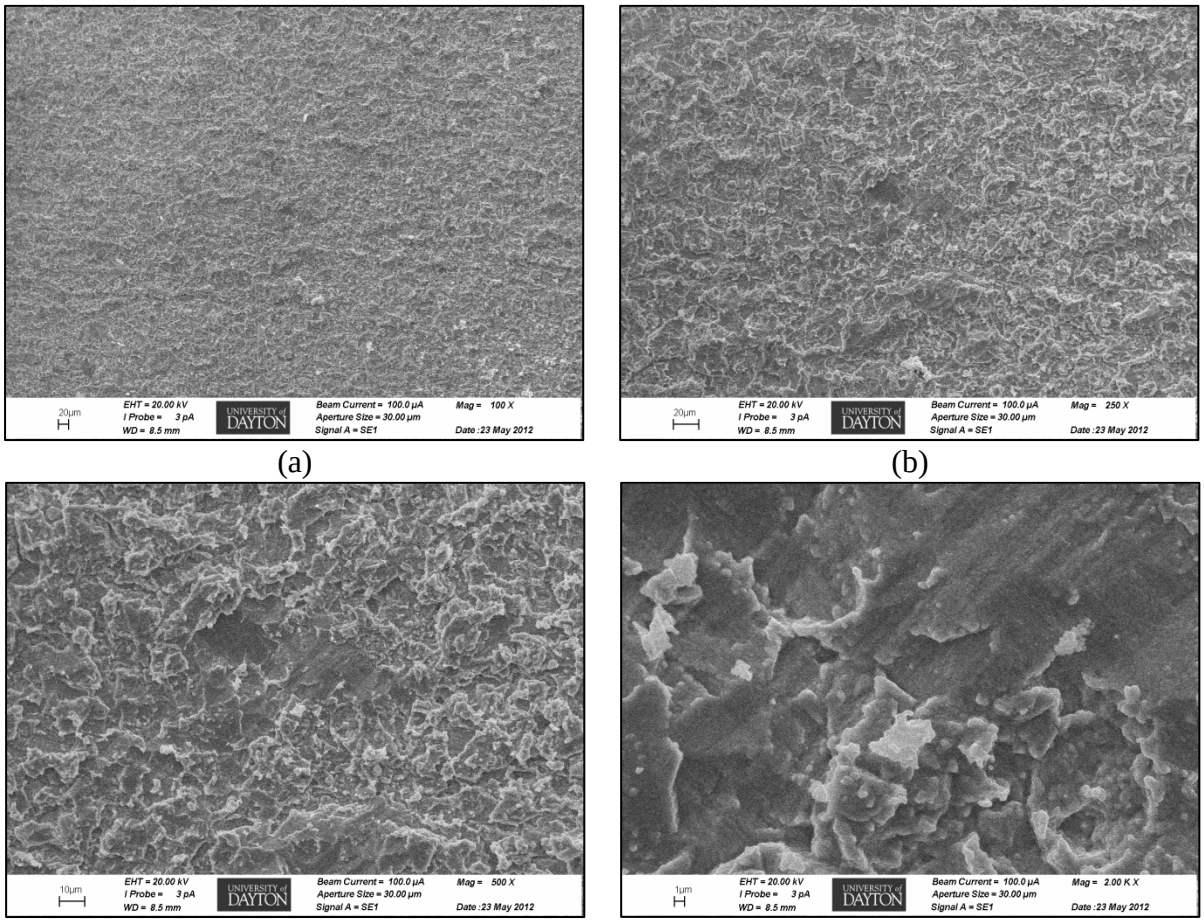


Figure M-45. SEM images of pure copper sample retrieved on 600 hours exposure from high UV (0.86 W/m2) and high Ozone (800 ppb) chamber. (a) 100X magnification (b) 250X magnification, (c) 500X magnification, and (d) 2000X magnification.

Distribution Statement A. Approved for Public Release.



(a) (b)

(c) (d)

Figure M-46. SEM images of pure copper sample retrieved on 500 hours exposure from high UV (0.86 W/m2) and high Ozone (800 ppb) chamber. (a) 100X magnification (b) 250X magnification, (c) 500X magnification, and (d) 2000X magnification.

Distribution Statement A. Approved for Public Release.

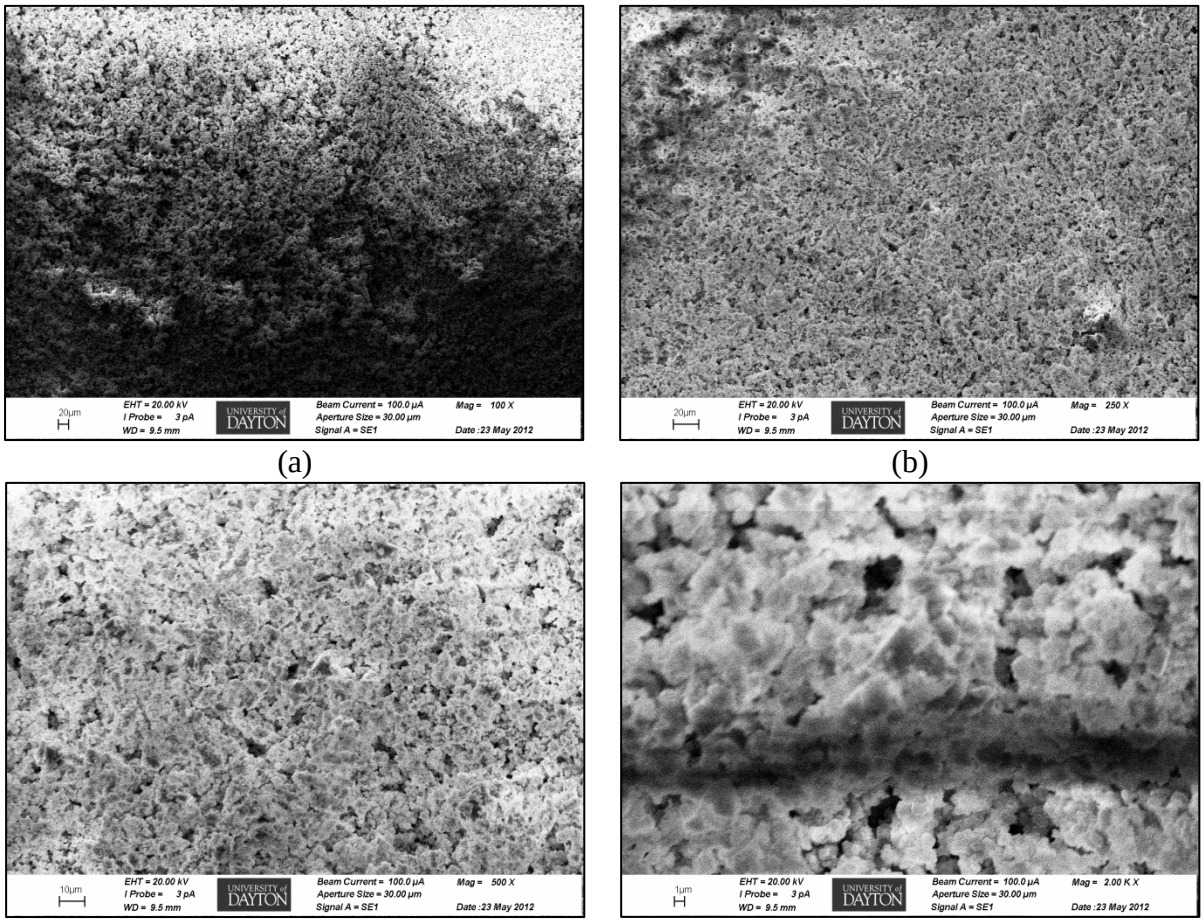


Figure M-47. SEM images of pure copper sample retrieved on 400 hours exposure from high UV (0.86 W/m2) and high Ozone (800 ppb) chamber. (a) 100X magnification (b) 250X magnification, (c) 500X magnification., and (d) 2000X magnification.

Distribution Statement A. Approved for Public Release.

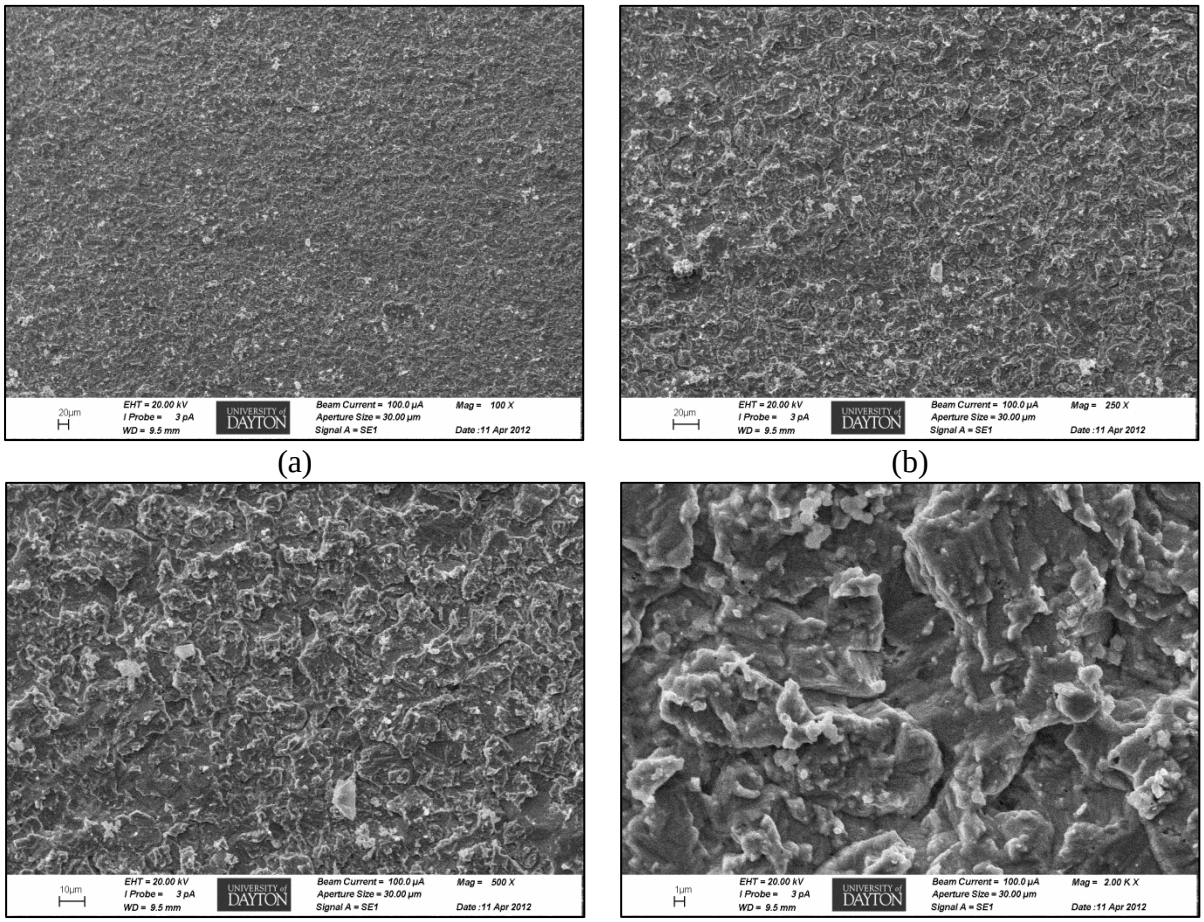


Figure M-48. SEM images of pure copper sample retrieved on 300 hours exposure from high UV (0.86 W/m2) and high Ozone (800 ppb) chamber. (a) 100X magnification (b) 250X magnification, (c) 500X magnification, and (d) 2000X magnification.

Distribution Statement A. Approved for Public Release.

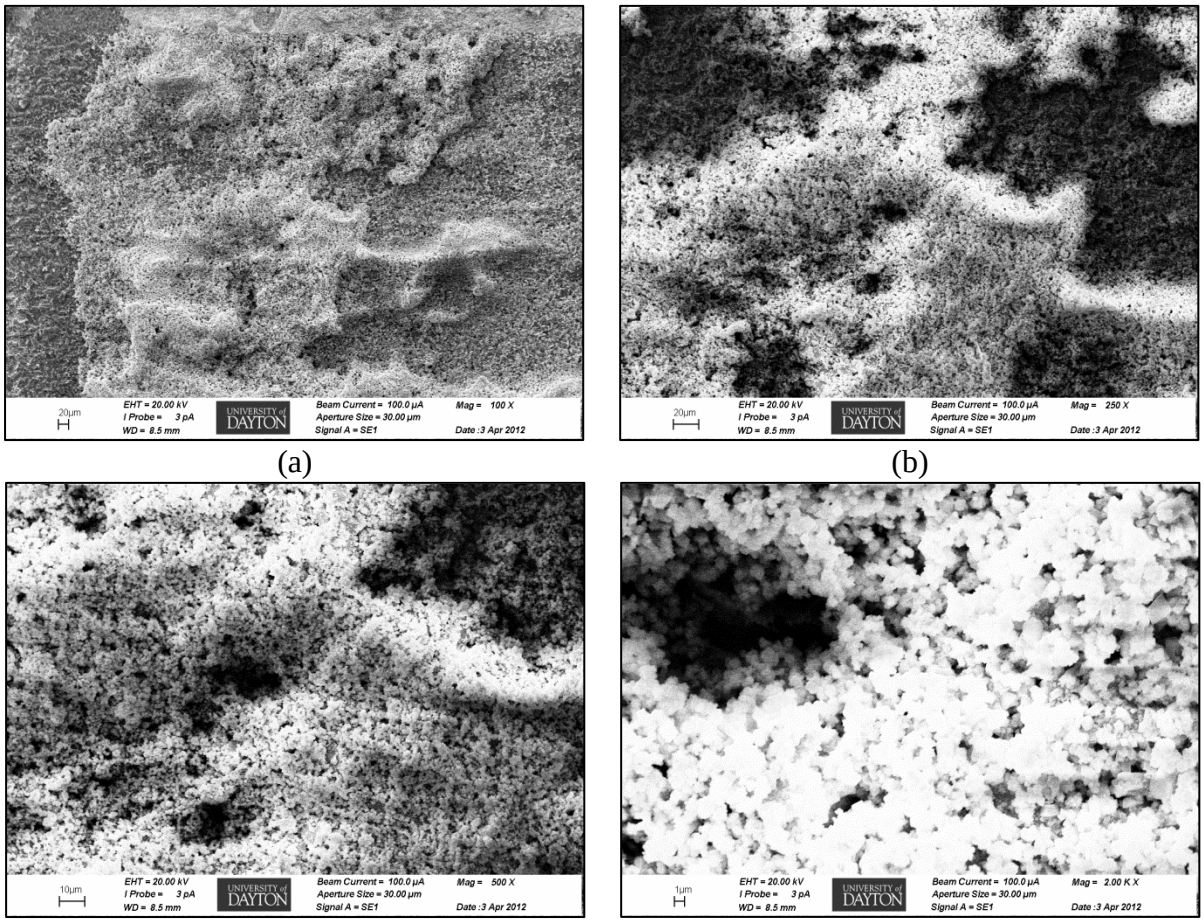


Figure M-49. SEM images of pure copper sample retrieved on 200 hours exposure from high UV (0.86 W/m2) and high Ozone (800 ppb) chamber. (a) 100X magnification (b) 250X magnification, (c) 500X magnification., and (d) 2000X magnification.

Distribution Statement A. Approved for Public Release.

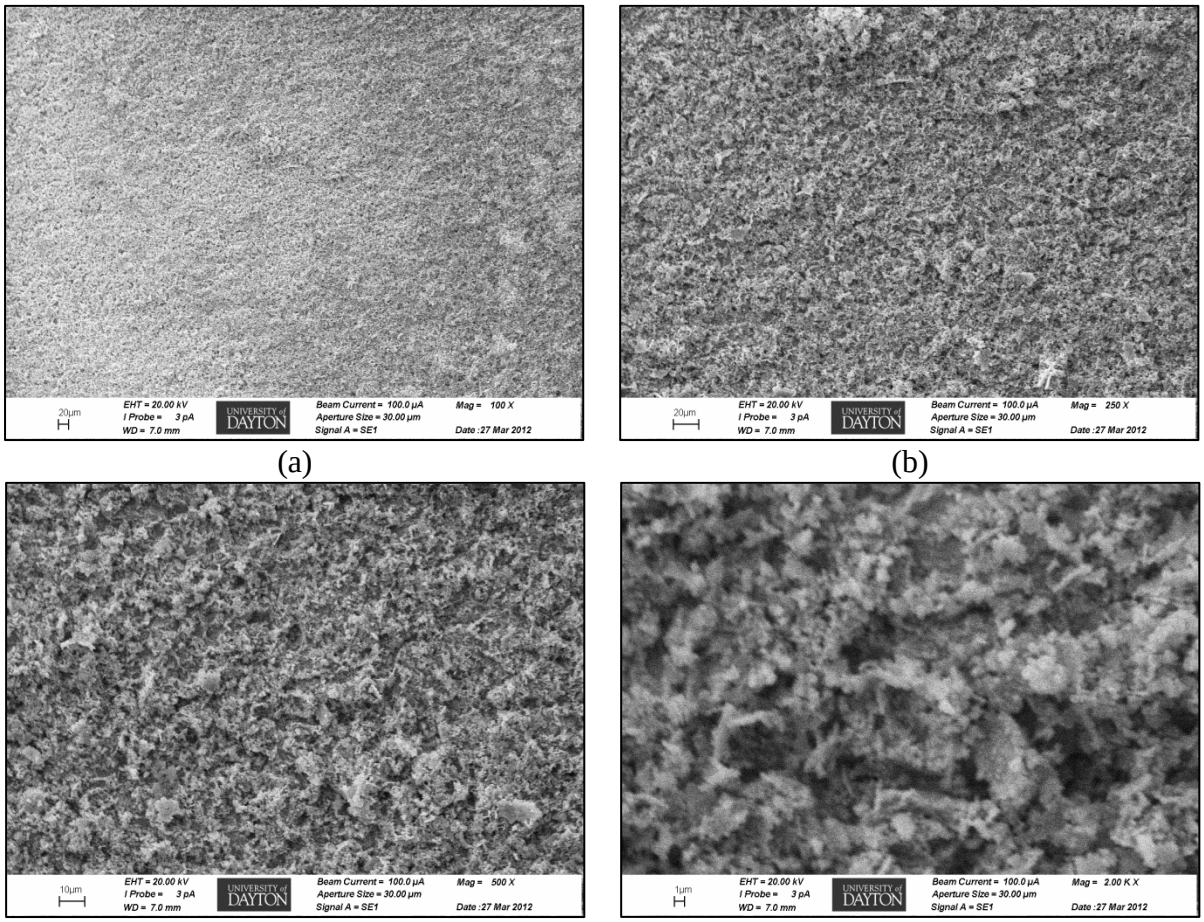
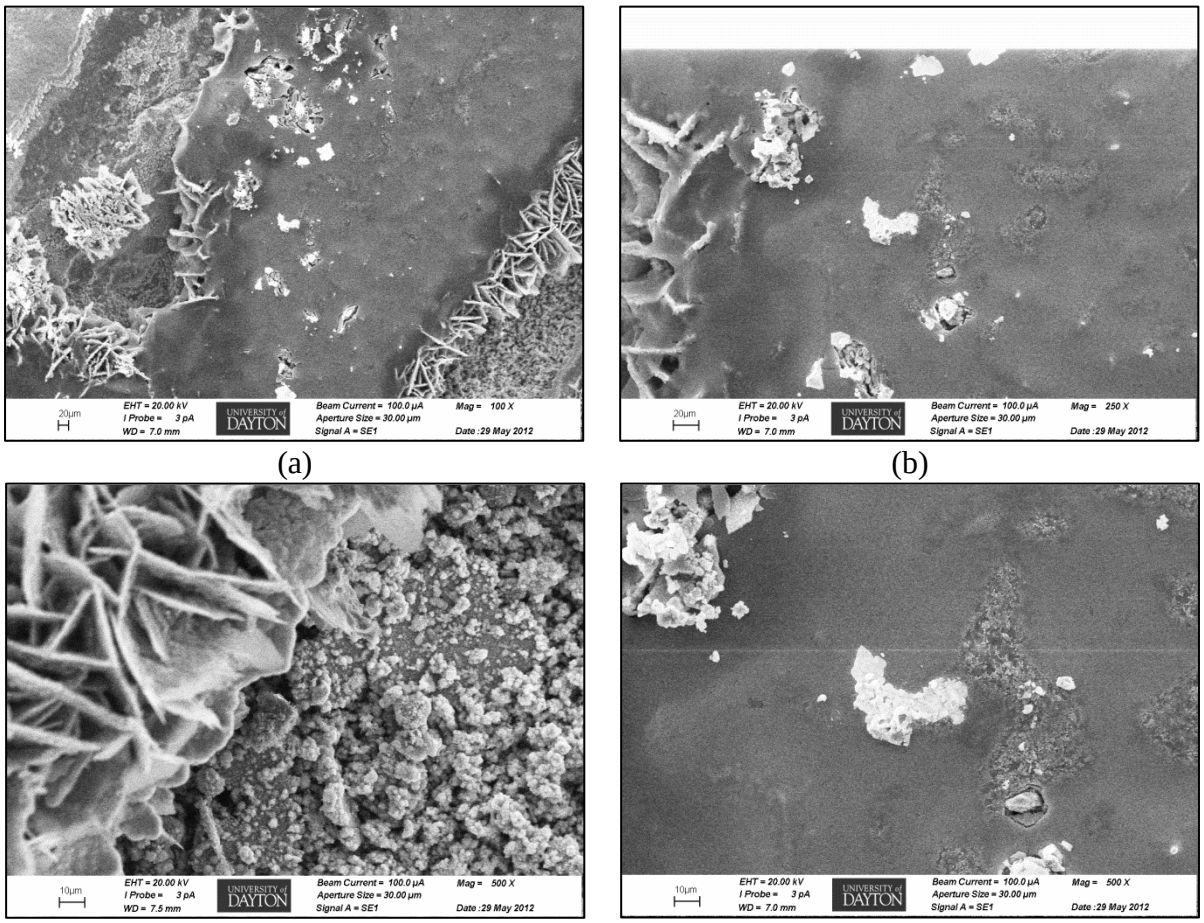


Figure M-50. SEM images of pure copper sample retrieved on 100 hours exposure from high UV (0.86 W/m2) and high Ozone (800 ppb) chamber. (a) 100X magnification (b) 250X magnification, (c) 500X magnification, and (d) 2000X magnification.

Distribution Statement A. Approved for Public Release.



(a) (b)

(c) (d)

Figure M-51. SEM images of 1010 steel sample retrieved on 1000 hours exposure from high UV (0.86 W/m2) and high Ozone (800 ppb) chamber. (a) 100X magnification (b) 250X magnification, (c) 500X magnification, and (d) 500X magnification.

Distribution Statement A. Approved for Public Release.

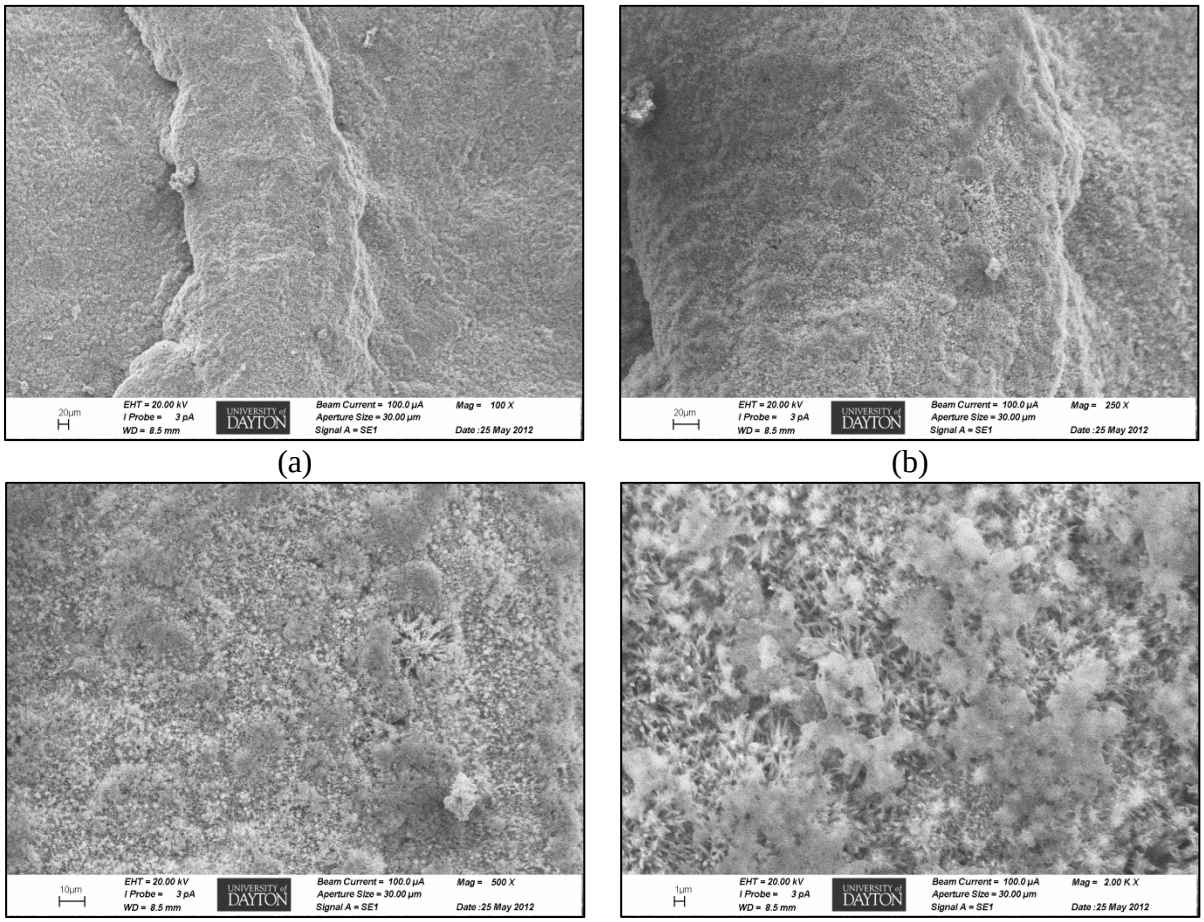


Figure M-52. SEM images of 1010 steel sample retrieved on 900 hours exposure from high UV (0.86 W/m2) and high Ozone (800 ppb) chamber. (a) 100X magnification (b) 250X magnification, (c) 500X magnification, and (d) 2000X magnification.

Distribution Statement A. Approved for Public Release.

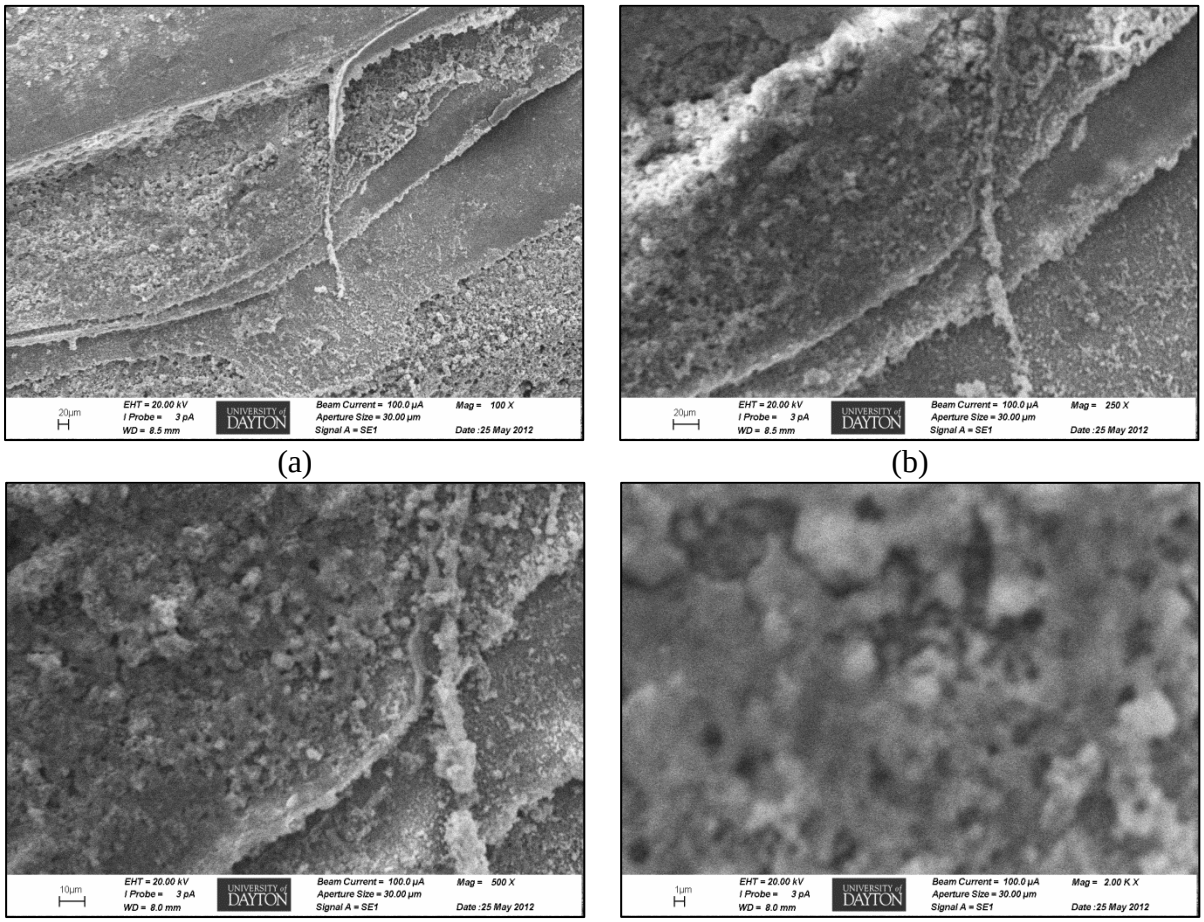
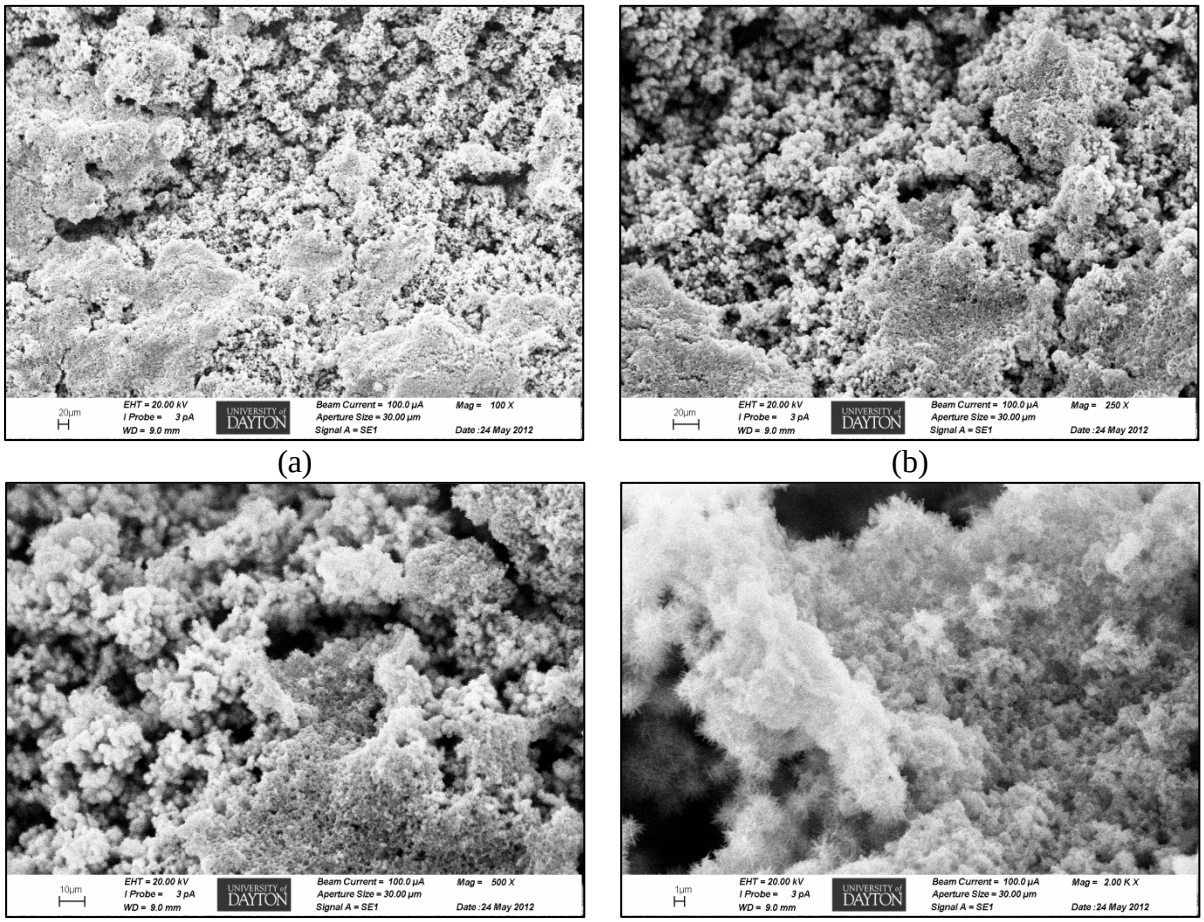


Figure M-53. SEM images of 1010 steel sample retrieved on 800 hours exposure from high UV (0.86 W/m2) and high Ozone (800 ppb) chamber. (a) 100X magnification (b) 250X magnification, (c) 500X magnification, and (d) 2000X magnification.

Distribution Statement A. Approved for Public Release.



(a) (b)

(c) (d)

Figure M-54. SEM images of 1010 steel sample retrieved on 700 hours exposure from high UV (0.86 W/m2) and high Ozone (800 ppb) chamber. (a) 100X magnification (b) 250X magnification, (c) 500X magnification, and (d) 2000X magnification.

Distribution Statement A. Approved for Public Release.

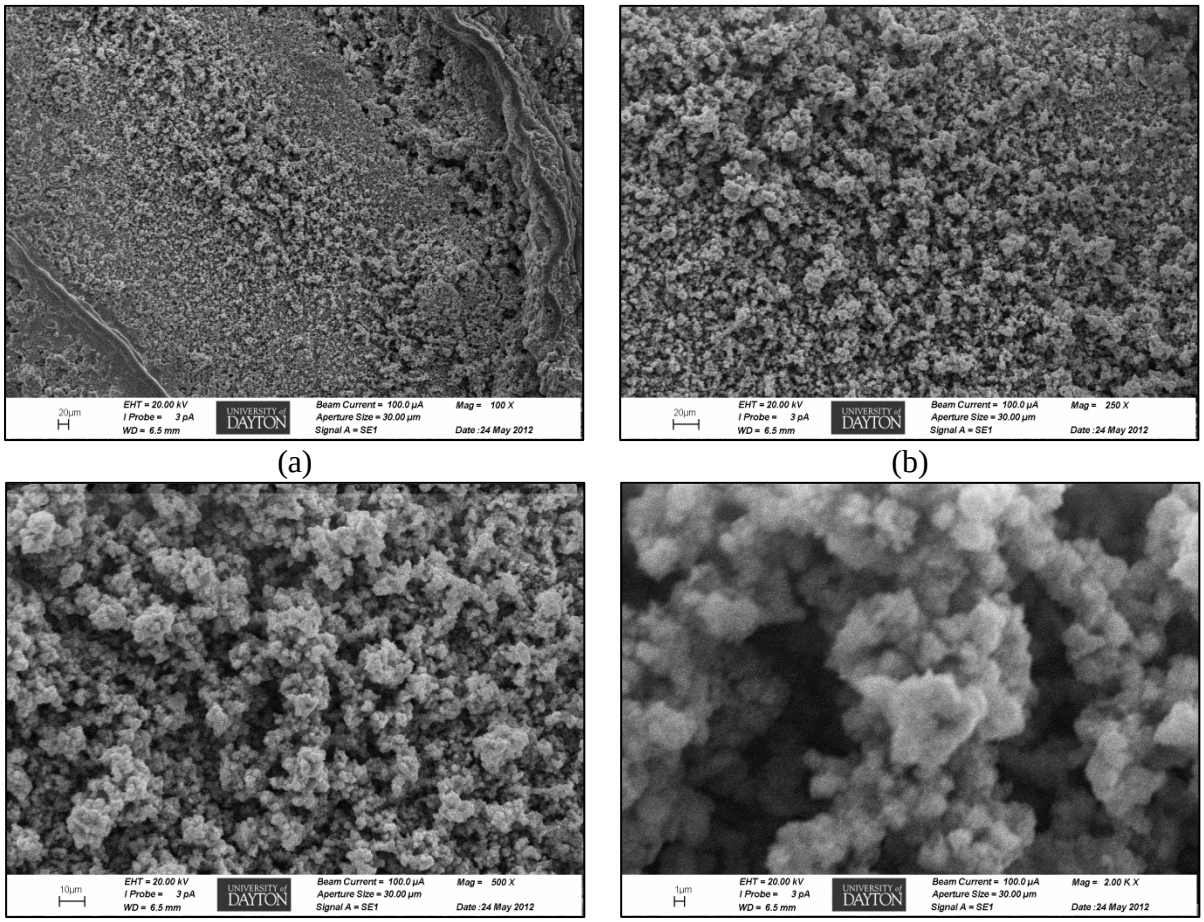


Figure M-55. SEM images of 1010 steel sample retrieved on 600 hours exposure from high UV (0.86 W/m2) and high Ozone (800 ppb) chamber. (a) 100X magnification (b) 250X magnification, (c) 500X magnification, and (d) 2000X magnification.

Distribution Statement A. Approved for Public Release.

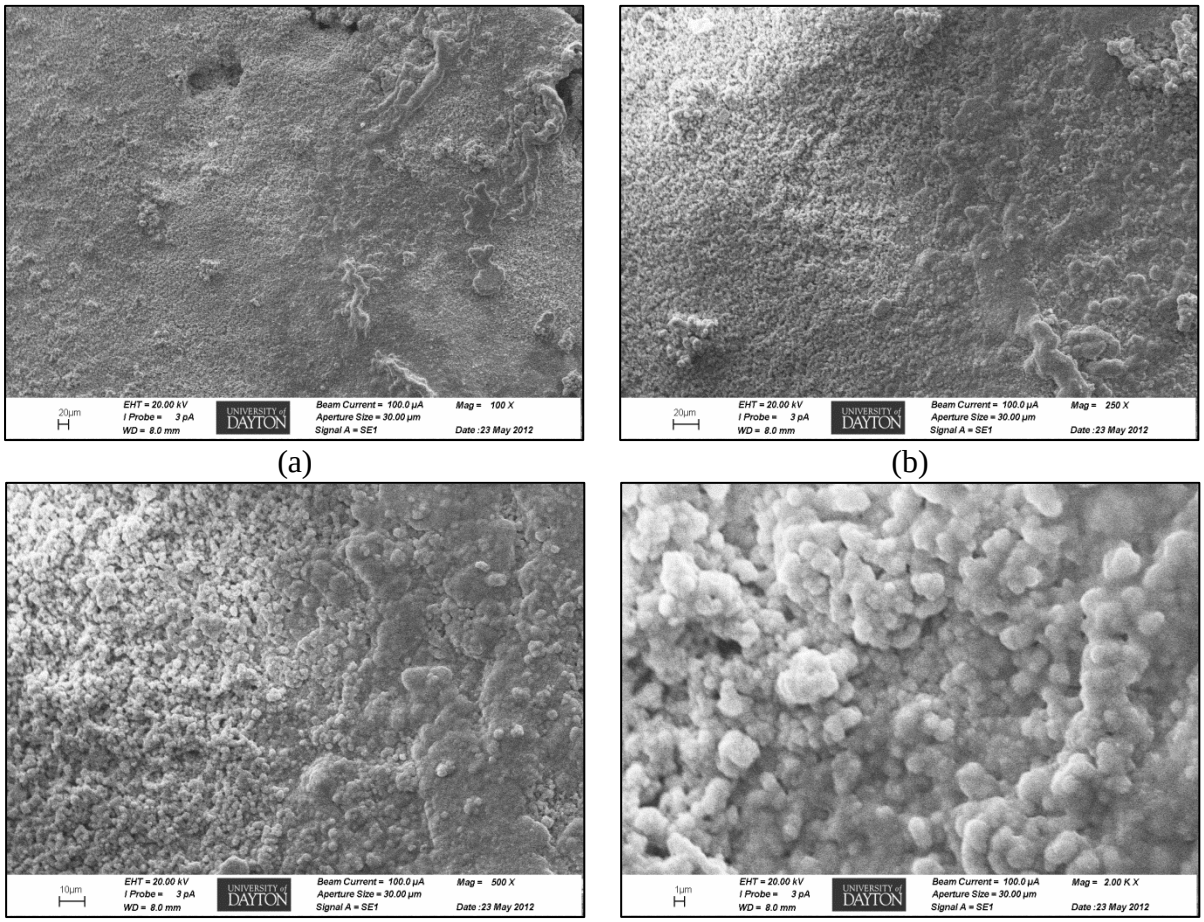


Figure M-56. SEM images of 1010 steel sample retrieved on 500 hours exposure from high UV (0.86 W/m2) and high Ozone (800 ppb) chamber. (a) 100X magnification (b) 250X magnification, (c) 500X magnification, and (d) 2000X magnification.

Distribution Statement A. Approved for Public Release.

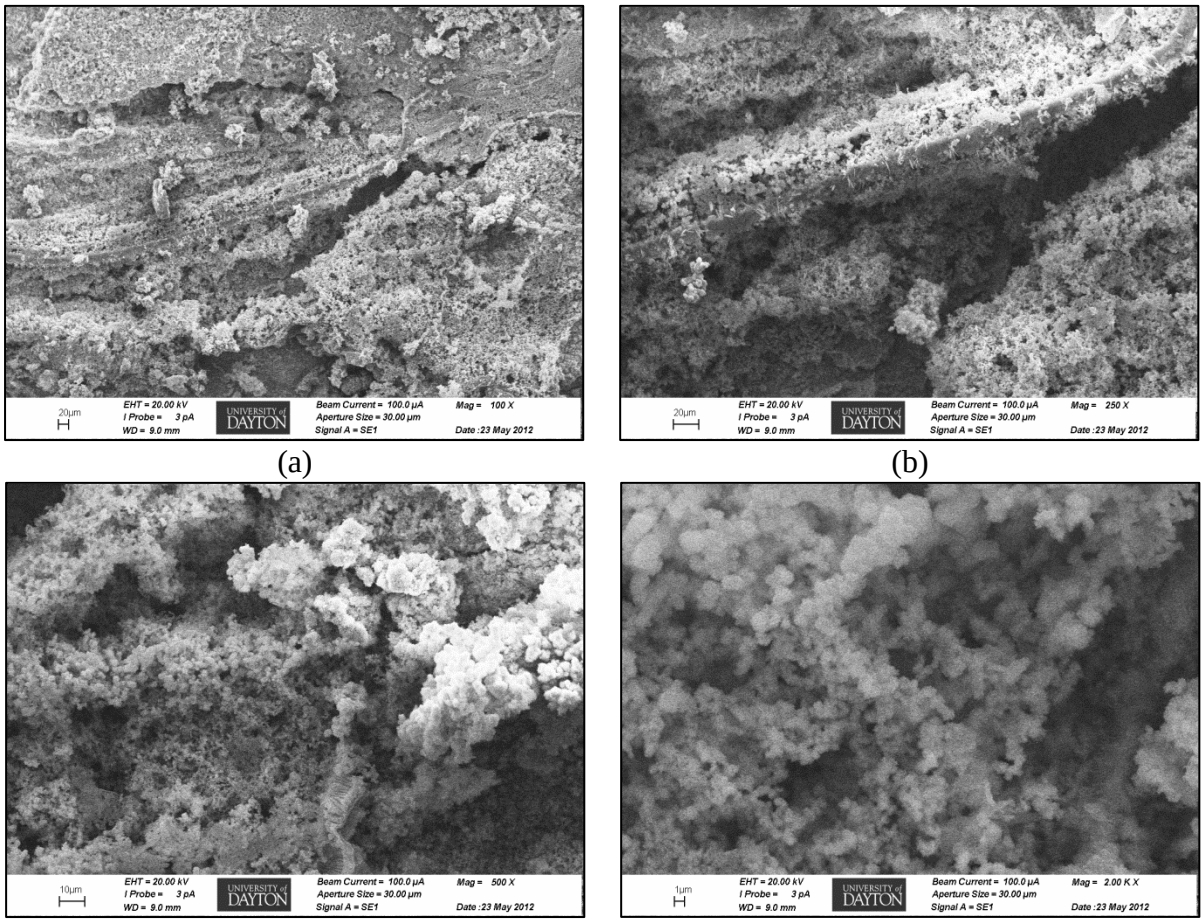


Figure M-57. SEM images of 1010 steel sample retrieved on 400 hours exposure from high UV (0.86 W/m2) and high Ozone (800 ppb) chamber. (a) 100X magnification (b) 250X magnification, (c) 500X magnification, and (d) 2000X magnification.

Distribution Statement A. Approved for Public Release.

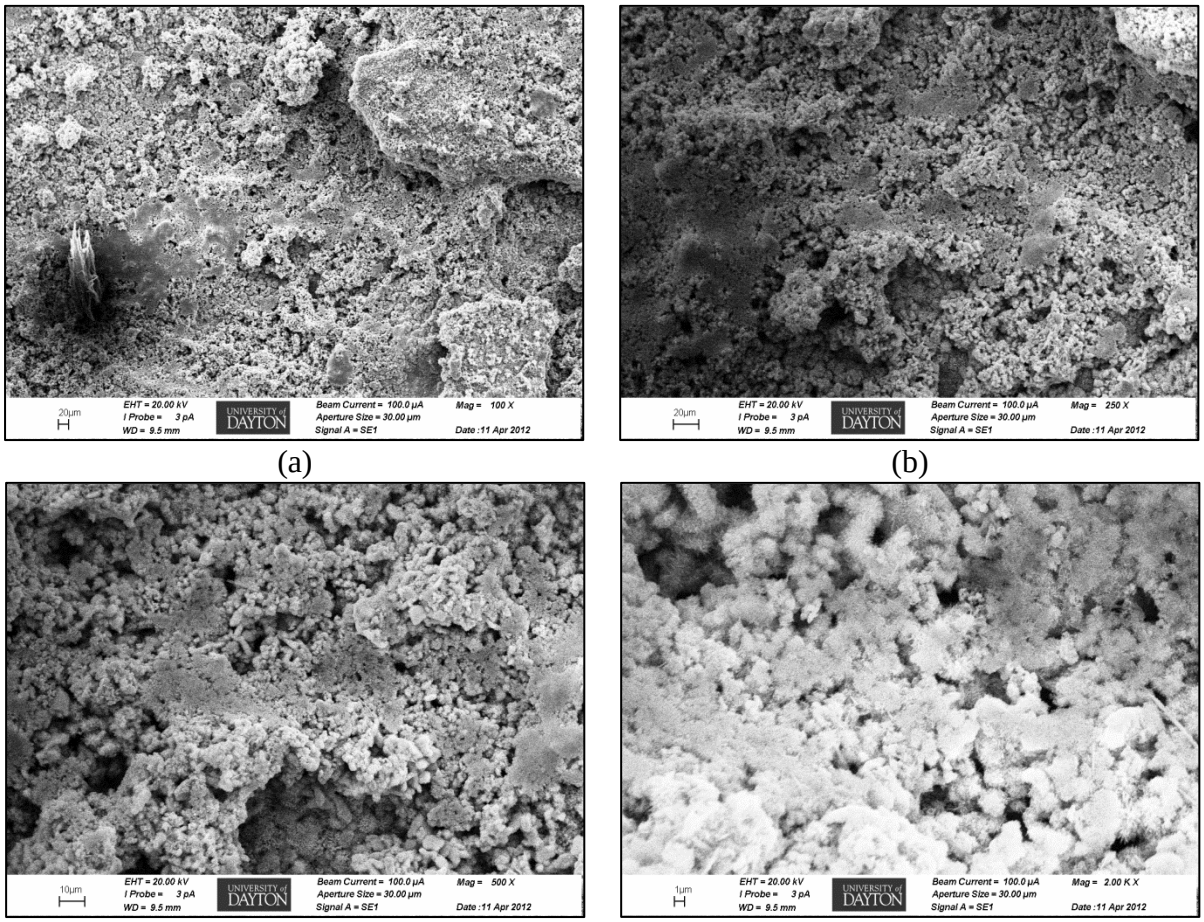


Figure M-58. SEM images of 1010 steel sample retrieved on 300 hours exposure from high UV (0.86 W/m2) and high Ozone (800 ppb) chamber. (a) 100X magnification, (b) 250X magnification, (c) 500X magnification, and (d) 2000X magnification.

Distribution Statement A. Approved for Public Release.

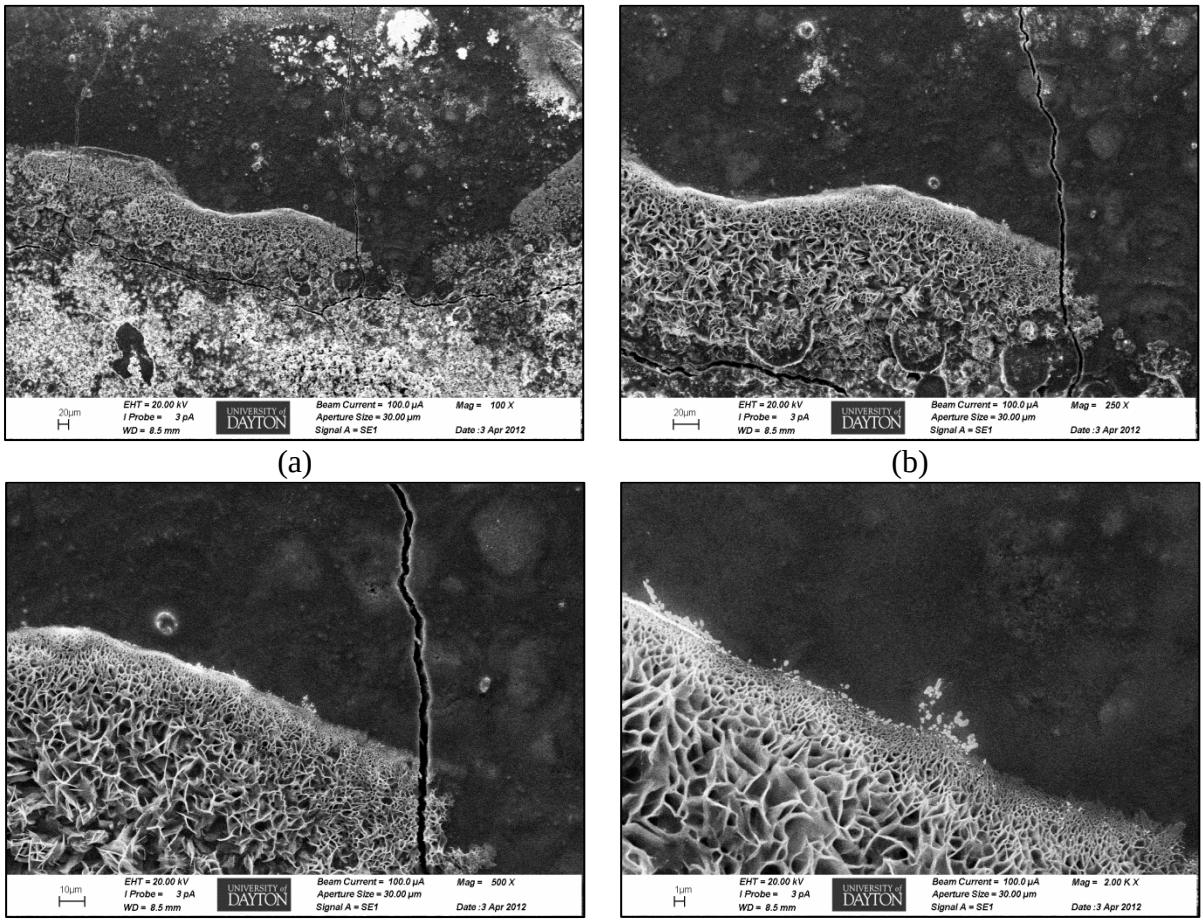
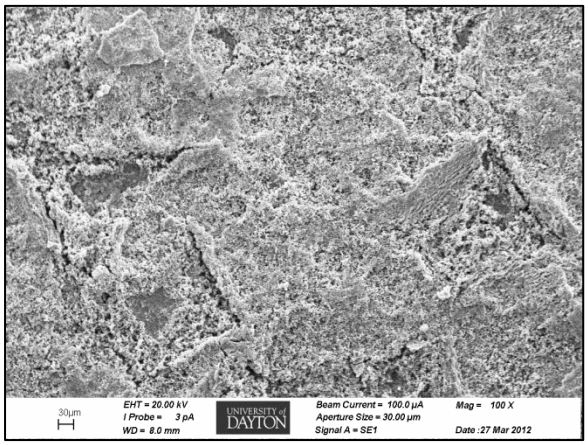
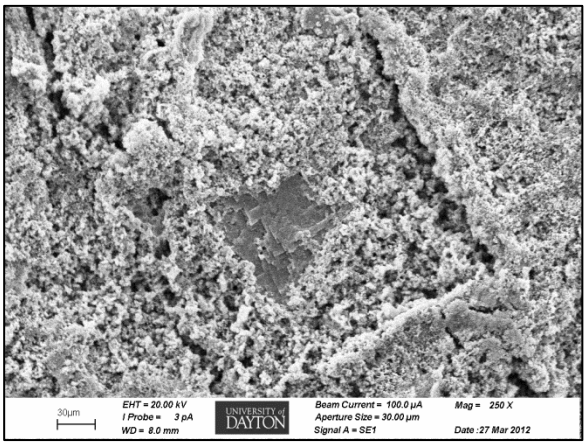


Figure M-59. SEM images of 1010 steel sample retrieved on 200 hours exposure from high UV (0.86 W/m2) and high Ozone (800 ppb) chamber. (a) 100X magnification (b) 250X magnification, (c) 500X magnification, and (d) 2000X magnification.

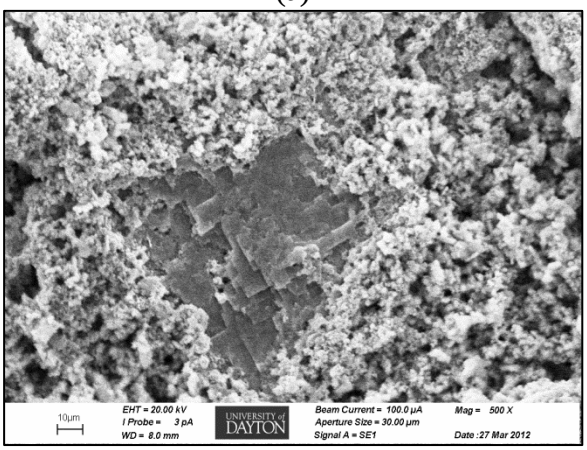
Distribution Statement A. Approved for Public Release.



(a)



(b)



(c)

Figure M-60. SEM images of 1010 steel sample retrieved on 100 hours exposure from high UV (0.86 W/m2) and high Ozone (800 ppb) chamber. (a) 100X magnification, (b) 250X magnification, and (c) 500X magnification..

Distribution Statement A. Approved for Public Release.