

Preface to Appendices

Eight separate appendices were developed to capture more of the images and information obtained for Test #5. Several appendices are further divided into subappendices to better segregate the information according to the time point in the test when the samples were extracted from the test apparatus, the location of the samples in the tank, the type of samples being evaluated, and the type of examinations performed. With the exception of Appendix I, each appendix represents a separate session of laboratory work that can be traced to a batch of samples that were typically processed in chronological order.

Appendix I provides the detailed project instructions that were used to initiate Test #5, to conduct routine operations during the test, and to terminate the test with sample recovery and cleaning procedures.

Section 2.4.1.1 of this report reviewed the nomenclature adopted for reporting ICET results. This nomenclature is used in the caption labels for most of the figures presented in the appendices.

As noted in Section 2.4.1.1, the data presented in the appendices are largely qualitative in nature, consisting primarily of SEM and TEM micrographs and EDS spectra. The SEM data are further subdivided into environmental (or low-vacuum) SEM of hydrated samples and microprobe SEM of fully desiccated samples. Microprobe images were generated using secondary electrons, which are sensitive to attenuation, to reveal fine structural details in a sample.

Transcriptions of the laboratory logbooks are provided for each appendix to document better commonalities that existed among the samples at the time of analysis. Logbook information was developed for most, but not all, of the images presented in the appendices. Interpretation and understanding of the images and their accompanying EDS spectra can be improved by referring frequently to the logbook sample descriptions and sequences.

Typically, a relatively large quantity of a test sample was delivered for SEM or TEM analysis, and then several small subsamples of each item were examined. Note that each subsample was assigned a sequential reference number during the laboratory session. These reference numbers have been cited in the figure captions whenever possible to preserve the connection between the micrographs and the notebook descriptions. Electronic filenames have also been stamped on the images to permit retrieval of the original data files, which are archived elsewhere. Individual data sets for a given sample item have been collated into a typical sequence of (1) visual image, (2) EDS spectra, and (3) semiquantitative mass composition.

Semiquantitative mass compositions are also presented for many of the EDS spectra. These results are obtained from a commercial algorithm that decomposes the spectra into the separate contributions of each element. Composition estimates should be interpreted with the caveats stated in Section 2.4.1.1 fully in mind.

Appendix titles are listed below for reference.

Appendix A ESEM/EDS Data for Test #5, Day-4 Fiberglass in Low-Flow Zone

Appendix B ESEM Day-15 Fiberglass

- B1. ESEM/EDS Data for Test #5, Day-15 Fiberglass in Low-Flow Zones
- B2. ESEM Data for Test #5, Day-15 Fiberglass in High-Flow Zones

Appendix C ESEM Day-30 Fiberglass

- C1. ESEM Data for Test #5, Day-30 Fiberglass in Low-Flow Zones
- C2. ESEM/EDS Data for Test #5, Day-30 Fiberglass Samples in a Big Envelope in Low-Flow Zones
- C3. ESEM Data for Test #5, Day-30 Fiberglass in High-Flow Zones
- C4. ESEM Data for Test #5, Day-30 Fiberglass Inserted in Front of Header in High-Flow Zones
- C5. ESEM/EDS Data for Test #5, Day-30 Fiberglass Inserted in Nylon Mesh in High-Flow Zones
- C6. ESEM/EDS and SEM Data for Test #5, Day-30 Drain Collar Fiberglass
- C7. ESEM/EDS Data for Test #5, Day-30 Birdcage Fiberglass

Appendix D SEM/EDS Data for Test #5, Day-30 Deposition Products

Appendix E SEM Day-30 Coupons

- E1. SEM/EDS Data for Test #5, Day-30 Aluminum Coupons
- E2. SEM/EDS Data for Test #5, Day-30 Copper Coupons
- E3. SEM/EDS Data for Test #5, Day-30 Galvanized Steel Coupons
- E4. SEM/EDS Data for Test #5, Day-30 Steel Coupons

Appendix F SEM/EDS Data for Test #5, Day-30 Sediment

Appendix G TEM Data for Test #5 Solution Samples

Appendix H UV Absorbance Spectrum—Day-30 Solution Samples

Appendix I ICET Test #5: Pre-Test, Test, and Post-Test Project Instructions

Appendix A

ESEM/EDS Data for Test #5, Day-4 Fiberglass in Low-Flow Zone

List of Figures

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During ICET Test #5, work continued for the purpose of identifying the origin and chemical composition of the products that were formed during the test. One objective of ICET tests is to identify the composition of debris that collects on fiberglass and the particulate substances in the test solution. To address this question partially, low-flow fiberglass samples on Test #5 Day 4 were examined by Environmental SEM (ESEM)/EDS, including both the exterior and the interior location of the fiberglass samples.

ESEM was employed to analyze the hydrated fiberglass samples. These samples were examined under a low vacuum condition (i.e., 80 Pa) and without any coating, to minimize the modification of the fiberglass samples through drying process. EDS results provide a semi-quantitative elemental analysis of the debris attached on fiberglass.

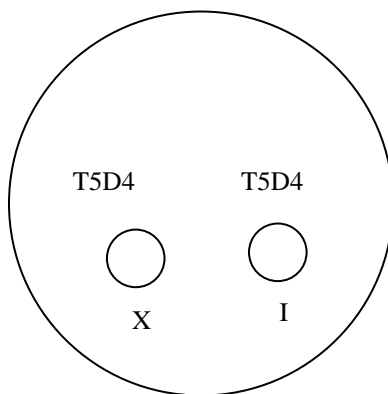
Test #5 Day-4 low-flow fiberglass samples were obtained on July 30, 2005 (Day 4 for Test #5). SEM/EDS data presented here were obtained on August 3, 2005.

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Transcribed Laboratory Log

Laboratory session from August 3, 2005.

ESEM/EDS Test #5 Day-4 fiberglass in low-flow zone



ESEM Exterior Low-Flow Fiberglass Samples

Image: T5D4Ex01	100 ×	ESEM image	Figure A-1
t5d4ex02	100 ×		Figure A-2
t5d4ex03	500 ×	ESEM at higher magnification	Figure A-3

ESEM/EDS Interior Low-Flow Fiberglass Samples

Image: t5d4lfin04	100 ×	ESEM image	Figure A-4
t5d4lfin05	500 ×	ESEM of debris	Figure A-5
EDS: t5d4lfin06		EDS on flocculence deposits t5drlfin05	Figure A-6
Image: t5d4lfin07	500 ×	ESEM image	Figure A-7
EDS: t5d4lfin08		EDS on deposits on t5d4lfin07	Figure A-8

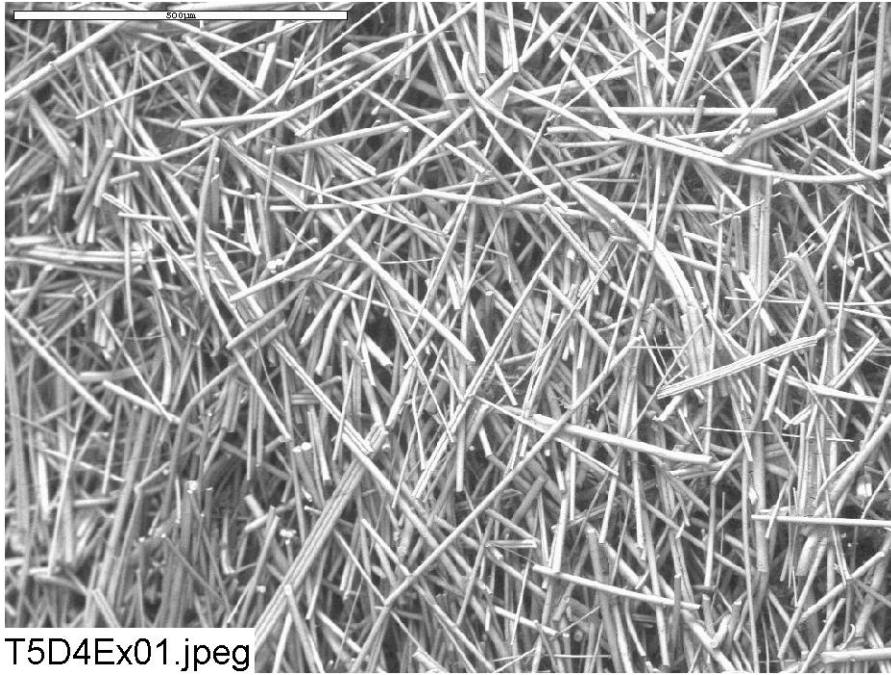


Figure A-1. ESEM image magnified 100 times for a Test #5, Day-4 low-flow exterior fiberglass sample. (T5D4Ex01.jpeg)



Figure A-2. ESEM image magnified 100 times for a Test #5, Day-4 low-flow exterior fiberglass sample. (t5d4ex02.jpeg)

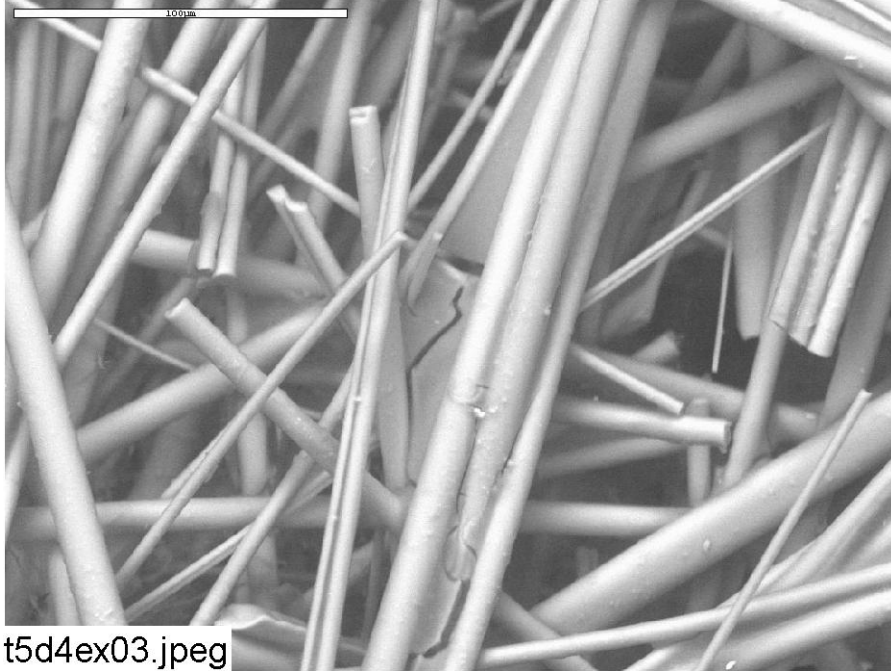


Figure A-3. ESEM image magnified 500 times for a Test #5, Day-4 low-flow exterior fiberglass sample. (t5d4ex03.jpeg)

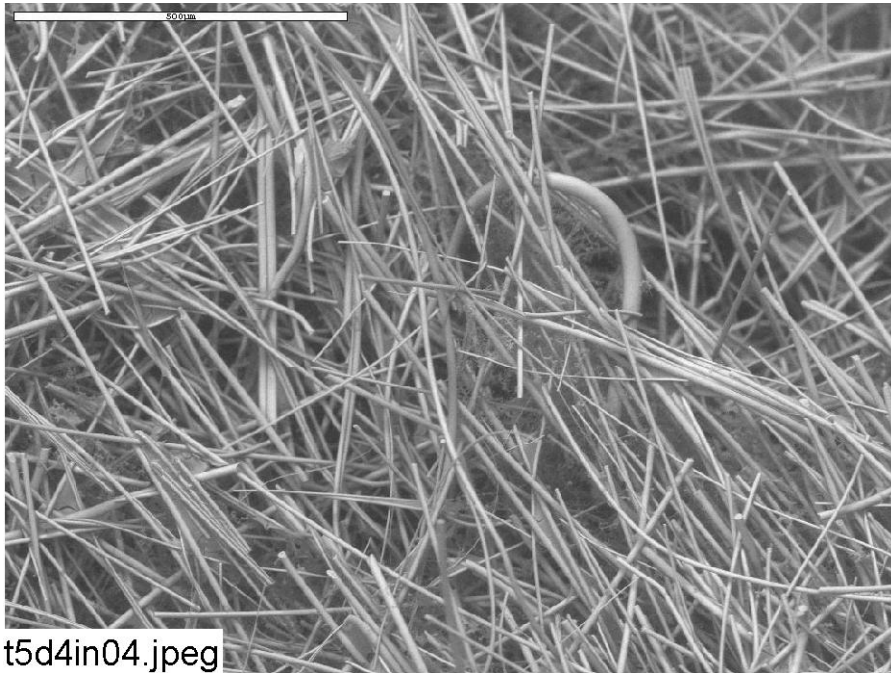


Figure A-4. ESEM image magnified 100 times for a Test #5, Day-4 low-flow interior fiberglass sample. (t5d4in04.jpeg)

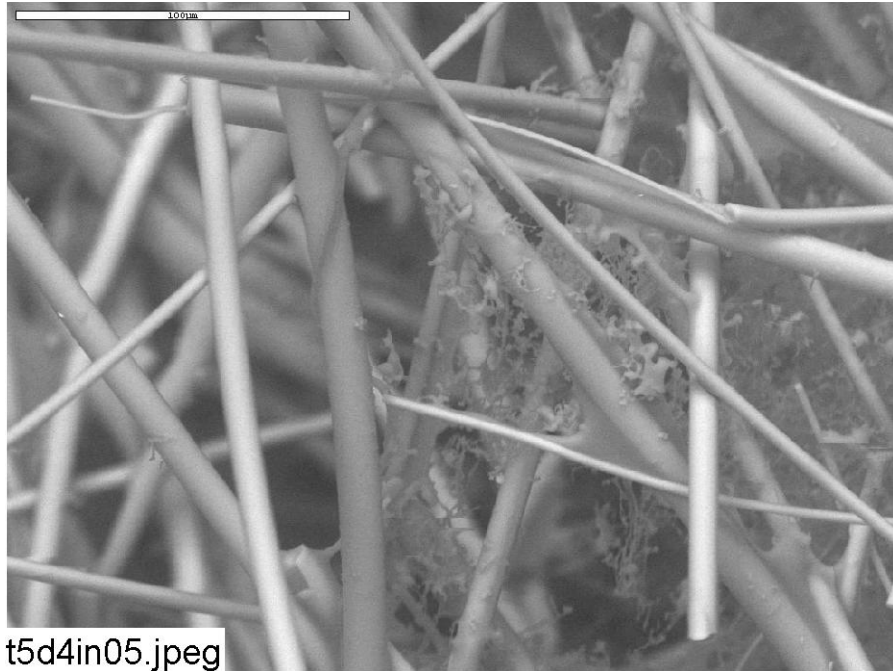


Figure A-5. ESEM image magnified 500 times for a Test #5, Day-4 low-flow interior fiberglass sample. (t5d4in05.jpeg)

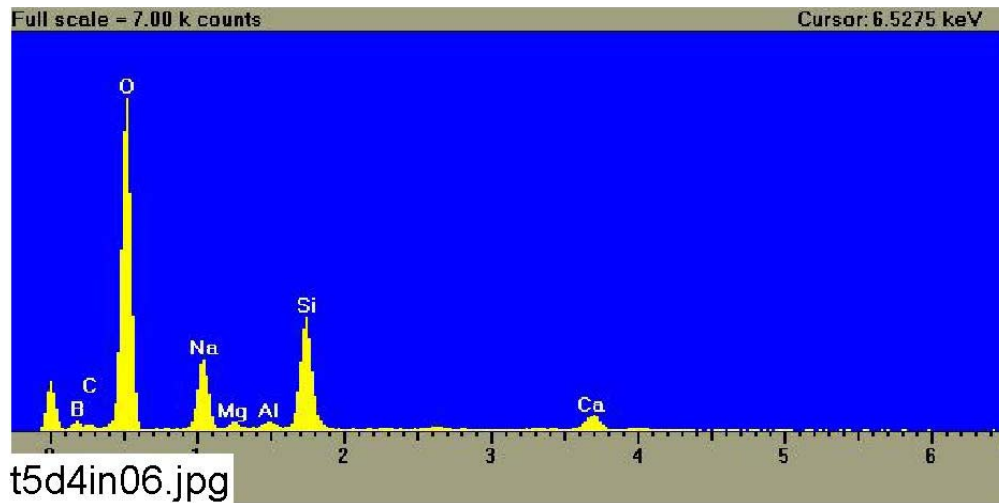


Figure A-6. EDS counting spectrum for the flocculence deposits between fibers shown in Figure A-5. (t5d4in06.jpg)

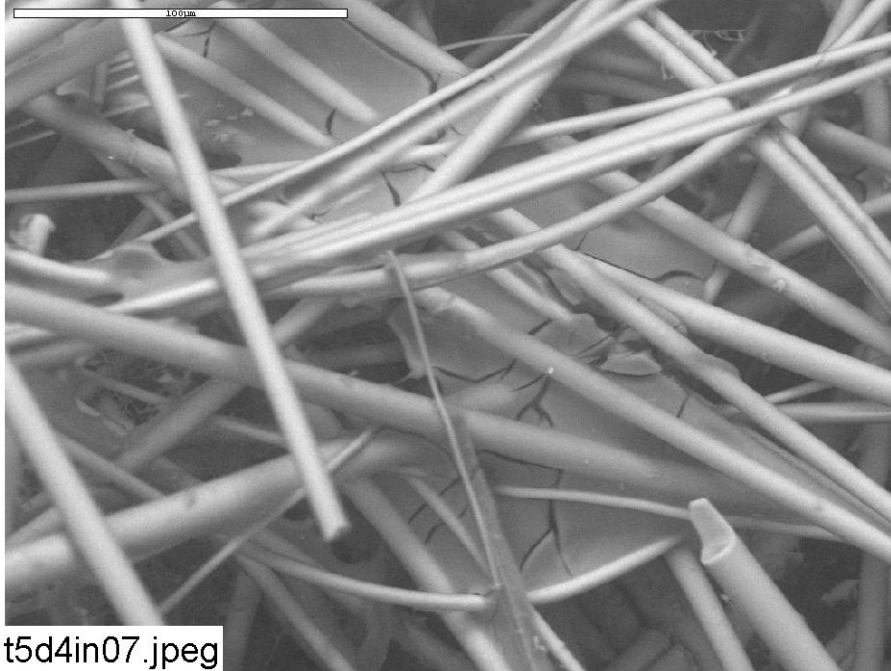


Figure A-7. ESEM image magnified 500 times for a Test #5, Day-4 low-flow interior fiberglass sample. (t5d4in07.jpeg)

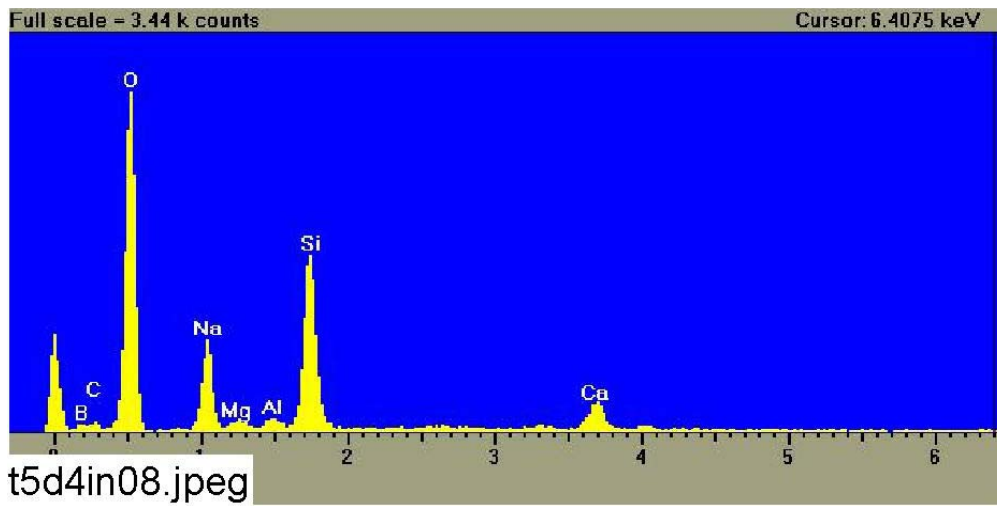


Figure A-8. EDS counting spectrum for the deposits between fibers shown in Figure A-7. (t5d4in08.jpeg)

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