Hall D Wire Characterization

Samples F7-2 & F7-1

1. **Sample preparation:** ultrasonic cleaning in DI water for 45 minutes.
2. **Sample installation:** for SEM inspection wires were installed on a sample holder (diameter=36 mm) on 2 stripes of conductive carbon tape, 2 fragment of each sample per stripe (nomenclature: F5-1a, F5-1b and F5-2a, F5-2b).



Pic1. Sample installation.

**Wire inspection:**

1. Each wire fragment was examined along its length (beginning at approximately 5mm from the sample holder edge and ending ~5mm before the opposite edge) at magnification of ~x600, at fast scan rate.
2. Images at designated magnifications (x300, x500, x800, x1000) were taken randomly along the sample length;
3. Images for the ovality measurements were taken at 1000x magnification in three points of each wire fragment: in the middle (approximately) and close to both ends;
4. Measurements of wire diameter, as visible on the images, were done using the Quartz PCI Image Management System, 3 measurements per image;
5. Additional images at various magnifications were taken at the points of interest (variations in sample topography, contaminated areas, etc.)
6. EDS analysis was performed on the most typical points of interest.

**Note:**

Sample F7-1 was inspected BEFORE the current protocol was established, thus the report on F7-1 differs slightly from other reports.

**Sample F7-2 A, B**

I. Images at designated magnifications

|  |  |
| --- | --- |
| F7-2A-1 | F7-2B-1 |
| F7-1a x300 1_q00.jpg | F7-2b x300 1_q00.jpg |
| Magnification: 300x | Magnification: 300x |
|  |  |
|  |  |
|  |  |
| F7-2A-2 | F7-2B-2 |
| F7-2a x500 4_q00.jpg | F7-2b x500 3_q00.jpg |
| Magnification: 500x | Magnification: 500x |
|  |  |
|  |  |

|  |  |
| --- | --- |
| F7-2A-3 | F7-2B-3 |
| F7-2a x800 10_q00.jpg | F7-2b x800 4_q00.jpg |
| Magnification: 800x | Magnification: 800x |
|  |  |
|  |  |
|  |  |
| F7-2A-4 | F7-2B-4 |
| F7-2a x1000 2o_q00.jpg | F7-2b x1000 6_q00.jpg |
| Magnification: 1000x | Magnification: 1000x |
|  |  |

II. Ovality Measurements

|  |  |
| --- | --- |
| F7-2A-1o | F7-2B-1o |
| F7-1a x1000 1o.JPG | F7-2b x1000 1o.JPG |
| Magnification: 1000x | Magnification: 1000x |
|  |  |
| F7-2A-2o | F7-2B-2o |
| F7-2a x1000 2o.JPG | F7-2b x1000 2o.JPG |
| Magnification: 1000x | Magnification: 1000x |
|  |  |
| F7-2A-3o | F7-2B-3o |
| F7-2a x1000 3o.JPG | F7-2b x1000 3o.JPG |
| Magnification: 1000x | Magnification: 1000x |

III. Points of Interest

|  |  |
| --- | --- |
| F7-2A-3 | F7-2A-3 |
| F7-1a x6000 3_q00.jpg | f7-2a black cont 3.bmp |
| Magnification: 6000x | EDS Analysis. Environmental contamination |
|  |  |
| F7-2A-5 Minor surface damage | F7-2A-6 Minor surface damage |
| F7-2a x2500 5_q00.jpg | F7-2a x1800 6_q00.jpg |
| Magnification: 2490x | Magnification: 1800x |
|  |  |
| F8-2A -8 | F7-2A -8 |
| F7-2a x30000 8_q00.jpg | f7-2a surf damage 8.bmp |
| Magnification: 30000x | EDS Analysis. Surface damage. Possible traces of Cu |

|  |  |
| --- | --- |
| F7-2A-7 | F7-2A-7 |
| F7-2a x50000 7_q00.jpg | f7-2a surf damaget 7.bmp |
| Magnification: 50000x | EDS Analysis. Surface damage. Possible Cl contamination |
|  |  |
| F7-2B-5 | F7-2B-8 |
| F7-2b x2500 5_q01.jpg | F7-2b x30000 8_q00.jpg |
| Magnification: 2500x Contamination | Magnification: 30000x |
|  |  |

**Sample F7-1 A, B**

Images at designated magnifications

|  |  |
| --- | --- |
| F7-1A-1 | F7-1B-1 |
| F7-1a_m01.jpg | F7-1b_m04.jpg |
| Magnification: 250x | Magnification: 250x |
|  |  |
|  |  |
|  |  |
| F7-1A-2 | F7-1B-2 |
| F7-1a_m02.jpg | F7-1b_m05.jpg |
| Magnification: 500x | Magnification: 500x |
|  |  |
|  |  |

|  |  |
| --- | --- |
| F7-1A-3 | F7-1B-3 |
| F7-1a_m03.jpg | F7-1b_m06.jpg |
| Magnification: 800x | Magnification: 800x |
|  |  |
|  |  |
|  |  |
| F7-1A-4 | F7-1B-4 |
| F7-1A_m02.jpg | F7-1b_m07.jpg |
| Magnification: 1000x | Magnification: 1000x |
|  |  |
|  |  |

II. Ovality Measurements

|  |  |
| --- | --- |
| F7-1A -1o | F7-1B -1o |
| F7-1A 1o.JPG | F7-1B 1o.JPG |
| Magnification: 1000x | Magnification: 1000x |
|  |  |
| F7-1A -2o | F5-2B-2o |
| F7-1A 2o.JPG | F7-1B 3o.JPG |
| Magnification: 1000x | Magnification: 1000x |
|  |  |
| F7-1A -3o | F7-1B -3o |
| F7-1A 3o.JPG | Sorry, image was not saved. |
| Magnification: 1000x | Magnification: 1000x |

III. Points of Interest

|  |  |
| --- | --- |
| F7-1A-7 Surface contamination. | F7-1A-7 |
| F7-1a_m05.jpg | F7-1a black spot.bmp |
| Magnification: 1000x | EDS Analysis. Surface contamination. Carbon. |
|  |  |
| F7-1A-4 Surface structure detail. | F7-1A-minor surface scratch |
| F7-1a_m04.jpg | F7-1a-scratch1_q00.jpg |
| Magnification: 100000x | Magnification: 1500x |
|  |  |
| F7-1B-8 Surface feature. | F7-1B-11 Surface feature. |
| F7-1b_m08.jpg | F7-1b_m11.jpg |
| Magnification: 15000x | Magnification: 100000x |

**Note**: No Cu was observed by EDS probe for the features F7-1B-8 and F7-1B-11.