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Second Look at the Al/Au Wire for the BaBar Drift Chamber

We have made a further examination of the pitting observed in the 0.0032″ gold-plated aluminum wire from California Fine Wire. Our Amray 1200B scanning electron microscope is equipped a Kevex Model 7000 x-ray analysis system. Using this we have made atomic-number scans at the pit shown in Fig. 1 and in a region off to the side where the surface appears more uniform.

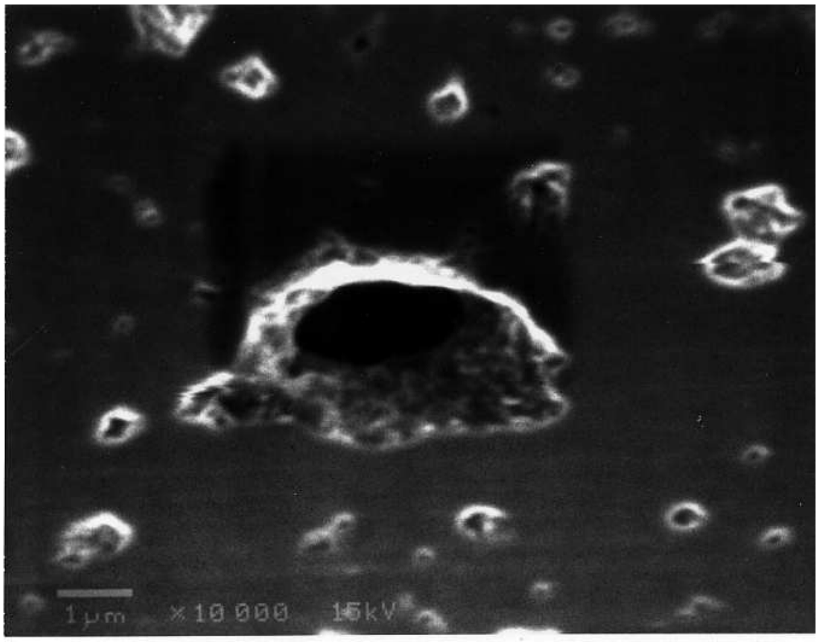

Figure 1: Closeup electron micrograph of 0.0032″ gold-plated aluminum wire from California Fine Wire.

Figure 2 shows the x-ray analysis for a smooth region of Fig. 1. The horizontal axis is x-ray energy. The experimental data is the histogram at the middle of the plot. Along the bottom of the plot are shown the calculated positions of the x-ray lines, in this case for gold. We see a large peak at the M-edge at 2.3 keV, and a smaller peak at the L-edge at 12 keV. A peak at the 1.5-keV K-edge of aluminum is also seen.

Figure 3 shows the x-ray analysis for the large pitted region of Fig. 1. There is little evidence for the gold lines. We infer that the pitting invloves local loss of the gold plating.

This analysis cannot determine whether the pits include loss of aluminum.

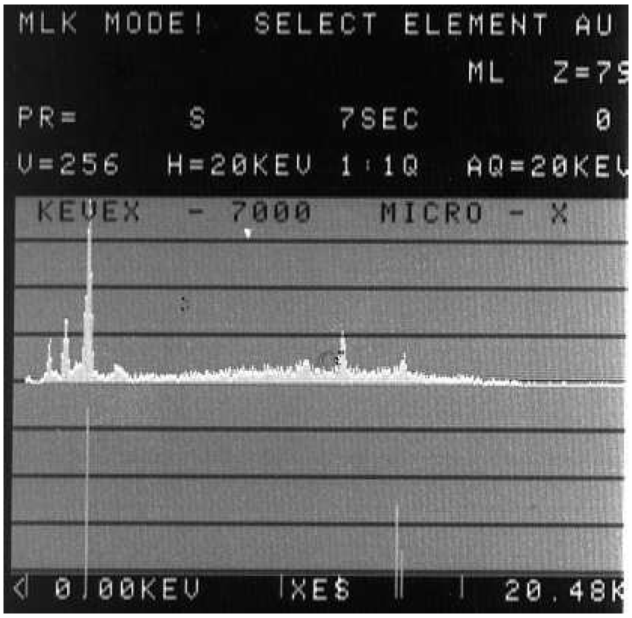

Figure 2: X-ray analysis of a smooth region of Fig. 1, indicating the presence of both gold and aluminum.

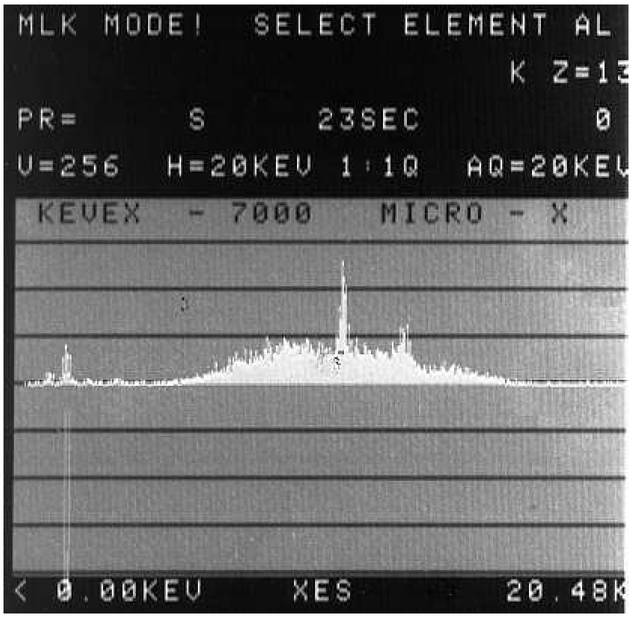

Figure 3: X-ray analysis of the large pitted region of Fig. 1 indicating the presence of aluminum, but essentially no gold.