Tungsten Sputter Coating Development to Produce Hi-Z Shells*

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We developed a tungsten sputter coating process to uniformly deposit tungsten on 840 μm diameter GDP shells using a bounce coating technique. We were able to control the tungsten coating rate and therefore coating thickness based on gravimetric analysis. At the end of our work we routinely produced uniform 0.5 μm tungsten coatings on GDP shells having a Δ_{wall} = 0.01 μm. New techniques were developed to measure coating uniformity using x-radiography and x-ray fluorescence data. The best surface roughness for a bounce-coated shell having a 0.5 μm tungsten coating was 20 nm RMS. Stationary GDP shells were coated with 0.5 μm tungsten and found to have surface roughness of 10 nm RMS, which was equivalent to the roughness of the underlying GDP mandrel surface. This result indicates that sputter coating processes using less agitation such as tap or roll coating may produce smoother surfaces for final tungsten coated shells.

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