

Characterization of Contaminants in Beryllium Capsules*

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The current point design for ignition experiments at the National Ignition Facility in 2010 is a graded copper doped beryllium capsule. The permissible concentration of other elements in the capsule is restricted by a specification on the total x-ray opacity added by these contaminants, which include argon, oxygen, and other metals. It is desirable to use non-destructive techniques such as contact radiography and x-ray fluorescence for routine characterization of these contaminants. To validate these techniques for production use, we have performed a cross comparison of the two and further analyzed the capsules using Inductively Coupled Plasma-Mass Spectrometry (ICP-MS) and oxygen analysis by fusion in a furnace followed by infrared detection on evolved gases. We have used additional characterization techniques in coating process development such as Auger spectroscopy and electron probe microanalyses to further verify the elemental composition measurements. The sensitivity and limitations of these techniques will be compared.

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