THE INFLUENCE OF INTERNAL BERYLLIUM MICROSTRUCTURE AND IMPURITIES ON THE CRL X-RAY OPTICAL PROPERTIES

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The model of the internal beryllium structure



According to the Materion technical specification, O-30-H beryllium grade has an average

SEM studies of the beryllium microstructure



EDX analysis of beryllium oxide distribution (b) in O-30-H Be grade. SEM image of longitudinal surface section of O-30-H grade (a).



The X-ray image (96 Be CRL

R=50um) of the test structure

X-rays

Image surface

Image surface

High-resolution X-ray microscopy based on the refractive lenses

The influence of the beryllium microstructure on HRXM





The X-ray microscopy experimental scheme with two sets (O-30-H and IS-50M) of beryllium compound refractive lenses grain size 15 um and contains up to 0.5% BeO, while the IS-50M beryllium grade - only 0.2% BeO, but it has an average grain size at least 100. BeO is distributed preferably along the Be grain boundaries due to the beryllium chemical reaction with oxygen.

The small-angle X-ray scattering data of different Be grades





Siemens star test object without the speckle suppressor (b) and after introducing the speckle suppressor (c)











Coherence manipulation - clear absorption contrast image of the boron fiber after insertion of the speckle suppressor

Optical properties of the highly porous beryllium



Direct beam shape information was lost after 5mm thickness of porous Be (distance – 30m)!



at 12keV

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Conclusions

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