

## **Analysis of focused beam powder x-ray diffraction using curved crystal optics**

Ayhan Bingölbali and C. A. MacDonald

Center for X-Ray Optics, University at Albany, SUNY, Albany, NY 12222

### **ABSTRACT**

X rays emitted isotropically from a conventional source can be focused onto a small sample area to give efficient utilization for powder diffraction with torroidal crystal optics. Measurements were made using a very low power (~30 W) microfocus source for several small inorganic standard samples. Diffracted peak width, resolution, and intensity were analyzed. The resolution determined from the uncertainty in measured peak location was much smaller than the peak width due to the focussed beam, and was limited by the pixel size of the area detector. A simulation model was developed to understand the diffraction ring shape and width, and a simple geometrical model was used to predict peak width. Good agreement was found between the simulation, the geometrical calculation and the measured peak width data.