

## Texture Analysis of a $\text{Ca}_3\text{Co}_4\text{O}_9$ Thermoelectric Film on Si (100) Substrate

W. Wong-Ng, Y.F. Hu<sup>1</sup>, R. He<sup>2</sup>, M. Otani, M. Vaudin, N. Lowhorn, and Q. Li<sup>1</sup>, Ceramics Division, National Institute of Standards and Technology, Gaithersburg, MD 20899; <sup>1</sup>Materials Science Department, Brookhaven National Laboratory, Upton, NY 11973; <sup>2</sup>Bruker AXE, Inc., Madison, WI 53711.

Information on film texture is important for correlating the structure and thermoelectric properties of layered calcium cobalt oxides. We have conducted a texture analysis of a  $\text{Ca}_3\text{Co}_4\text{O}_9$  film that was grown on single crystal Si (100) (commercial wafer) in an *in situ* manner using the Pulse Laser Deposition facility at Brookhaven Laboratory. A computer-controlled diffractometer equipped with an area detector was used for phase characterization and for texture study. The monoclinic  $\text{Ca}_3\text{Co}_4\text{O}_9$  film has a strong texture with the [001] direction being parallel to the surface normal. Using an asymmetric configuration, the pole figures collected for several reflections demonstrated the absence of an in-plane epitaxial relationship between the film and the substrate. The results of pole figure analysis are compared to those of a transmission electron microscopy study.