

PPDO-088

**Application of a Novel Process for Cost Reduction in Spherical Radius
Polishing of Sapphire**

Helen M. Chan

Professor, Dept. Materials Science & Engineering, Lehigh University

Richard P. Vinci

Associate Professor, Dept. Materials Science & Engineering, Lehigh University

Industry Participants

INSACO Inc.

Abstract

Researchers at Lehigh have developed a novel process (*AGOG*) for generating an optical quality surface finish on sapphire substrates. The process has the potential to be more cost-effective than the current method, namely chemo-mechanical polishing of sapphire. Insaco Inc. is a company which specializes in the machining and polishing of ceramic components such as sapphire. It is located in Quakertown, PA, about 18 miles south of Lehigh University. Together, Lehigh and Insaco propose to further develop the *AGOG* process, and apply it to sapphire components with spherical surfaces. Such parts are used for specialized optical applications such as endoscopes and radomes. The conventional polishing of such surfaces for sapphire optical components is time consuming and expensive, and represents a significant portion of the total cost. Furthermore, maintaining sphericity is difficult because of sapphire's anisotropic crystal structure. If viable, the *AGOG* process would give Insaco a competitive edge in the existing market for such products, and allow them to expand and hire more PA workers.