

Characterization of Aluminum Nitride Piezoelectric Thin Films with Laser Doppler Vibrometry

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ABSTRACT

Aluminum Nitride (AlN) is an extremely attractive material for high temperature sensors and actuators that must work reliably in chemically and thermally harsh environments. Recently, the piezoelectric properties of AlN thin films have been under intense investigation. In order to determine the piezoelectric properties of AlN thin films extremely accurate measurements of c-axis displacement must be made. In this work a Laser Doppler Vibrometer was used to measure picometer level displacements induced by an oscillating voltage waveform applied across the AlN. Laser Doppler Vibrometry also allows the displacement across the surface of a sample to be mapped by scanning the laser beam over many predefined points. By using a Laser Doppler Vibrometer highly accurate measurements of the piezoelectric coefficient, d_{33} , can be made. In this presentation both scanning measurements and measurements of d_{33} are presented.