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Abstract

We study wave propagation in a piezoelectric ceramic half-space with a thin semiconductor film and an air gap between the film and the half-space. Two-dimensional equations for a thin film are used to model the semiconductor film and the air gap. The half-space is governed by the three-dimensional equations of linear piezoelectricity. It is shown that an anti-plane wave can propagate in such a system. An equation that determines the dispersion relation of the wave is obtained. Solutions to the equation show that the wave has both dispersion and attenuation, and can be amplified by a biasing dc electric field.

Keywords

Amplification, Acoustic wave, Piezoelectric, Semiconductor