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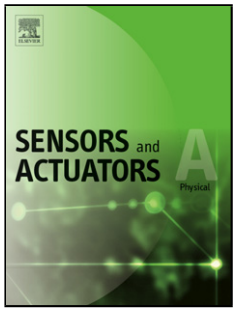

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ACCEPTED MANUSCRIPT

Analysis of a Thickness-Shear Mode Vibrator for the Accelerometer in Vector Hydrophones

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Highlights

.The directional voltage response of a thickness-shear mode vibrator was derived

.The vibrator constituted the main part of an inertia-type vector hydrophone.

.The voltage response of PMN-PT crystals having rhombohedral 3m symmetry was derived.

.The validity of the derived voltage response was verified through experiments.

.The new design method facilitates efficient development of vector hydrophones.

ABSTRACT

Typical hydrophones in line array sensors used to detect covert underwater targets can measure only sound pressure magnitude with the limitation of being unable to identify the direction of an incoming wave. In this paper, a thickness-shear mode vibrator is proposed as the main component of an inertia-type vector hydrophone to measure both the magnitude and direction of acoustic signals from targets. The piezoelectric single crystal lead magnesium niobate–lead

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