

Abstract Submitted
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Enhanced Magnetostrictively Transduced SAW Devices - Measurements & Applications NOBLE C. WOO, JONATHAN R. PETRIE, R. BRUCE VAN DOVER, Cornell University — Surface acoustic wave (SAW) transducers can be made with magnetic materials using magnetostriction as a means of electromechanical coupling. Unlike conventional piezoelectrically transduced SAW devices, the magnetically transduced SAWs do not require an exotic single-crystal substrate or high temperature processing, and therefore may be easily integrated into Si-based integrated circuits. These devices have many potential applications, biosensors being one of the most promising. When the substrate between a transmitter and a detector transducer is functionalized with specific bio-receptors, a binding event will affect propagation of the SAW wave that can be detected with simple electronics. In previous MTSAW devices, the magnetomechanical coupling was found to be poor, resulting in insufficient signal amplitude. To obtain better performance, we are studying the use of alternative magnetostrictive materials including an amorphous CoFeTaZr alloy, CoNbZr, and compositions in the Terfenol family (TbFe₂, etc.). We are using combinatorial materials science (continuous composition spread approach) to identify optimum alloy compositions. The devices are also being re-designed to yield better performance.

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