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Editorial

Special Issue on Wireless and Passive Surface Acoustic Wave Sensor

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The surface acoustic wave (SAW) generated by the so-called piezoelectric effect was confined to the piezoelectric substrate surface at a depth of one or two wavelengths; hence, it was very sensitive towards the external perturbations. Therefore, a SAW-based device can be used to explore a new approach of building many sensors for sensing chemical or physical measurements, such as gas, magnetic, current, pressure, and gyroscopes. High sensitivity, fast response, low power consumption, and small size were achieved with the sensor prototypes. Another outstanding property is that they work without a battery and use wireless interrogation, as they are connected only by a radio frequency link to a transceiver. This feature makes these devices very promising in extreme, harsh, or unattended scenarios. Great advances in wireless and passive SAW-based sensors have been reported in the recent literature.

This Special Issue presents breakthrough research on wireless and passive SAW sensing technologies, including some interesting applications of SAW sensors and some new designs of SAW devices.

A total of eight papers in various fields of wireless and passive sensing technology—including gyroscopes, current sensors, mass-loading detection, aerosol sensor, temperature, and new designs of sensing devices are presented in this Special Issue. Chen et al. reported the finite element analysis of the distribution parameters of metal dot array in SAW gyroscope, optimal design was determined theoretically [1]. Su. et al. reported a new design for an SAW current sensor, which employed FeGa magneto-strictive thin-film, and increased sensitivity was achieved [2]. You et al. implemented successful detection of small-size mass loading using a transversely coupled SAW resonator [3]. Chen et al. proposed a new design of aerosol sensor for multi-sized particles detection employing an SAW resonator and a cascade impactor [4]. Sun et al. presented the analysis and design of single-phase unidirectional transducers with high directivity, which are beneficial for ensuring a reduction in the insertion loss of SAW devices [5]. Tian et al. reported a novel microphonic crystal, employed as the waveguide layer for Love wave sensors, to improve the waveguide effect [6]. Chen et al. proposed an interesting investigation of electro-elastic properties of LN single crystals at low temperatures [7]. Gao et al. proposed a new algorithm for wireless and passive temperature sensors; very high precision in temperature sensing was achieved successfully [8].

Although submissions for this Special Issue have been closed, in-depth research in the field of wireless and passive SAW technologies continues to address the challenges we face today, such as exploring of high-temperature-resistant materials, packages, and sensitive mechanisms in the mission to meet extreme environmental sensing requirements.

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