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Ultrasonic Transducers for High Temperature Applications

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Message from the Guest Editor

Ultrasonic transducers play a key role in a number of strategically important fields in health monitoring and nondestructive testing. Applications that use ultrasonic transducers include the medical, aerospace, railroad, marine, and energy-related industries. The heart of an ultrasonic transducer is the piezoelectric element. Transducers currently used in these industries primarily employ PZT5-H as the piezoelectric element for ultrasound transmission and detection. This material has a Curie–Weiss temperature that limits its use to about 210 °C. Some industrial applications require much higher temperatures, i.e., 350–1000 °C, heat engines, steam generators, heat exchangers, steam pipes, deep geological exploration, etc.

The goal of this issue is to survey and review piezoelectric elements for use in high-temperature environments for the ultimate purpose of structural health monitoring (SHM), non-destructive evaluation (NDE), and material characterization (NDMC). The survey comprises the following categories: 1. High-temperature applications with single crystals; 2. Thick-film ceramics, and composite ceramics; 3. Sol–gel and spray-on transducers.



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Special Issue



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Message from the Editor-in-Chief

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