

# CALL FOR PAPERS

## Spotlight Issue on Lead-Free Piezoelectric Transducers

(Submission Deadline: November 30, 2022)

Since the early 1960s, the most important materials for ultrasonic transducers have been piezoelectric ceramics based on the  $\text{Pb}(\text{Zr,Ti})\text{O}_3$  (PZT) system. Even more recent materials such as the relaxor-derived single crystals from the 1990s and onwards generally contain a large amount of lead. However, due to the well-known toxicity of lead, there have been increasing legislative efforts to reduce the use of lead in electronics, at least since the first European ‘RoHS’ directive entered into force in 2002. Several countries outside Europe have implemented similar legislation, including China, Japan and South Korea. The exemption protecting PZT in European RoHS is up for revision in 2022.

Research activities on lead-free alternatives to PZT have been conducted for decades and led to reviews and monographs over the last 5 years, with a special attention to perspective applications. In most cases, new lead-free materials are evaluated on the basis of selected parameters which are initially useful to quantify their intrinsic performance (such as the piezoelectric coefficient  $d_{33}$ ), but many other parameters must also be taken into account for their integration in devices through relevant figures-of-merit for commercial applications. More knowledge is needed for various applications, performance of lead-free piezoelectric materials compared to PZT, present shortcomings and unknown parameters etc.

*IEEE Transactions on Ultrasonics, Ferroelectrics and Frequency Control* is organizing a Spotlight Issue entitled “Lead-Free Piezoelectric Transducers” to highlight latest innovations on this topic. Contributions in multiple submission categories (Original Research; Review Papers; Perspectives; Methods and Concepts) are being sought in a wide range of related topics including, but not limited to, the application of lead-free piezoelectric materials in the following fields:

- 1) Biomedical diagnostic transducers
- 2) Biomedical therapeutic transducers
- 3) Transducers for underwater acoustics
- 4) Transducers for industrial applications (cleaning, welding, machining etc.)
- 5) Transducers for non-destructive testing
- 6) Vibration and pressure sensors

Original research manuscripts submitted in this Spotlight Issue are expected to be full-length articles that report new and significant research advances whose feasibility and advantages have been demonstrated experimentally in the respective application areas. Manuscripts that only present theory and simulations without device fabrication and practical applications will not be aligned with the focus of this Spotlight Issue.

All contributions should be submitted online via the [Manuscript Central system](#) of *IEEE Transactions on UFFC*. When submitting, authors should select Manuscript Type: “Spotlight”. In the “Cover Letter” section, authors should state that the submission is intended for the Spotlight Issue on Lead-Free Piezoelectric Transducers, and they should highlight how their manuscript is topically aligned with the scope of the Spotlight Issue stated above. Guidelines for improving quality and clarity of manuscripts may be found [here](#).

All manuscripts will be subjected to fast-track peer review. Editorial decisions will strive to be made within 30 days of submission. The submission deadline is November 30, 2022. Accepted manuscripts will be published in the *IEEE Transactions on UFFC* in the second quarter of 2023. The guest editors for this Spotlight Issue are:

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