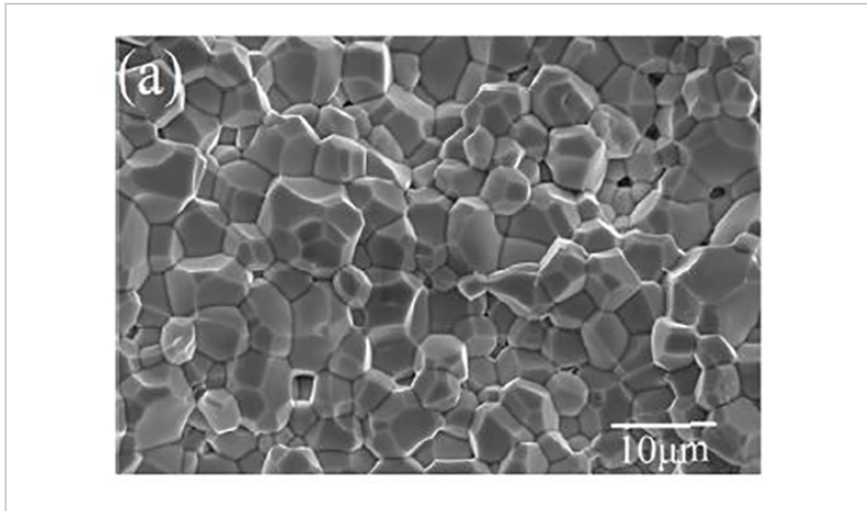


# High Performance Polycrystalline Piezoelectric Materials

ID# 2011-3871



xPNN-(1 - x)PHT(45/55)

## Technology Summary

The subject invention covers a novel, ternary polycrystalline composition of matter, which demonstrates improvements in dielectric and piezoelectric properties, electromechanical coupling and thermal stability over existing PZT-based ceramics. The invention possesses similar Curie temperature ranges with higher dielectric and piezoelectric properties than those of commercially available PZT and PMNT ceramics. The invention's materials have also been engineered to have higher Curie temperatures with comparable dielectric and piezoelectric properties to existing commercial piezoceramics. Changing the material composition allows for tailoring the materials to exhibit relaxor-like characteristics, including broadened dielectric peaks and dispersive dielectric behavior with respect to frequency. The process to make the invention's compositions rely on a two-step precursor method.

## Application & Market Utility

The subject invention covers piezoceramic compositions suitable for high performance electromechanical applications, such as actuators, sensors and ultrasonic transducers. The lower cost structure of these polycrystalline compared to single crystals offers the potential for use as higher volume components in military, medical, electronics, automotive and other consumer-oriented applications.

## Next Steps

Seeking research collaboration and licensing opportunities.

TECHNOLOGY READINESS LEVEL

4-7

### Seeking

Investment | Licensing | Research

### Keywords

- piezoelectric polycrystalline material
- high performance electromechanical
- sensors, transducers and actuators
- dielectric materials
- U.S. Patent No. 8,889,030

### Researchers

#### Shujun Zhang

Professor of Materials Science and Engineering

#### Thomas Shrout

Professor of Materials Science and Engineering

[Website](#)

### Originating College

College of Earth and Mineral Sciences

### Office of Technology Management Contact

Smith, Matthew

mds126@psu.edu

814-863-1122