

Piezoelectric Sensors for Monitoring Material Properties

Track Code: 2020-LU-68799

Categories:

- Civil Engineering
- Materials and Manufacturing

Keywords:

- Active Monitoring
- Actuators
- Ceramics
- Coatings
- Concrete
- Data Processing
- Data Visualization
- Electrical Engineering
- Material Development
- Materials and Manufacturing
- Materials Science
- Mechanical Engineering
- Mechanical Properties
- Monitor
- Piezoelectric
- Polymers
- Software
- Stability

Engineers at Purdue University have fabricated novel polymer coatings for piezoelectric sensors, actuators, and transducers. The coating allows to nondestructively monitor properties of concrete in real-time for applications such as road construction. Piezoelectric sensors are rigid, and traditional compressive or flexural tests at construction sites do not accurately capture deformations in cement before brittle failure occurs. Methods such as compression and flexural testing have also been used; however, these techniques are time-consuming and cause damage to samples. In order to address industrial inconveniences as well as enhance characterization of strength and stiffness for cementite-based materials, engineers have developed piezoelectric technologies with an electromechanical impedance approach. These sensors have high sensitivity when probing materials as well as exhibit long-term durability. In addition, the piezoelectric sensors are low-cost and adapted with software programs.

Advantages:

- Nondestructive

- Efficient readout
- Long-term stability

Potential Applications:

- Piezoelectric sensors
- Materials science
- Manufacturing
- Road construction

People:

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Intellectual Property:

Application Date: August 7, 2020

Type: Provisional-Patent

Country of Filing: United States

Patent Number: (None)

Issue Date: (None)

Application Date: July 2, 2020

Type: Provisional-Patent

Country of Filing: United States

Patent Number: (None)

Issue Date: (None)

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