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Additively Manufactured Conductive Polymer Igniters/Initiators

A novel method produces safer, flexible, conductive polymer ignition systems that can replace dangerous metallic systems in applications such as airbags, munitions, and pulsed power thrusters.

Traditionally, ignition systems have used metallic spark gaps and bridgewires for applications ranging from explosive detonation and pulsed power thrusters to airbag deployment systems. Airbags have proven that these systems can be dangerous, as they have sent hot metal shrapnel from the initiation system through the airbag, causing bodily harm upon deployment.

Researchers at Purdue University have developed a method to fabricate conductive polymer spark gaps and bridgewire through the use of a doctor blading. A solution is distributed into molds, and cured, resulting in conductive polymer igniters on a flexible substrate. Experimental results showed that of the samples tested, all successfully sparked over. At a slightly higher breakdown voltage, the spark gaps were able to successfully ignite nanothermite material . Results prove that it is feasible to replace metallic ignition systems with a safer, polymer system.

Advantages:

- Safer

- Flexible

Potential Applications:

- Airbags

- Munition Systems

- Pulsed Power Thrusters

TRL: 1

Intellectual Property:

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Category
Chemicals & Advanced Materials/Polymer Science & Smart Materials
Aerospace & Defense/Hypersonics & Propulsion Systems

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