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Precisely Timed, Gasless Igniters with Tunable Sensitivity

A gasless fuze utilizing mechanically activated reactive materials provides precisely tunable timing control and ignition energy with reduced toxicity compared to conventional delay compositions.

Current delay compositions rely heavily on the use of barium chromate and potassium perchlorate, which are both toxic and environmentally hazardous, while Al and Ni compositions are considerably more environmentally friendly and less or non-toxic. Also, current methods are unable to be tuned to a precise level of input energy and burn rate. Therefore, improvements are needed within the industry.

Researchers at Purdue University have developed a gasless fuze with a precisely tunable delay. The delay of the fuze is controlled utilizing mechanically activated gasless reactive materials as the reactive material in the fuze's delay element. Conventional gasless systems rely on a hot wire to initiate the fuze, an inherently imprecise technique. Many of these systems also produce significant amounts of gas, while this technology provides truly precise timing control while being a completely gasless system.

Advantages:

-Improved gasless ignition system

-Tuned to ignite upon introduction to a substantially precise level of input energy

-Tuned to burn at a selected rate

Potential Applications:

-Initiation of rocket motors and expendable heat sources

-Explosives, fragmentation grenades, and smoke grenades

-Pyrotechnics

TRL: 4

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