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Metal-free Primary Explosive

A thermally stable, lead-free primary energetic offering greener primer performance with safer combustion behavior.

Primers play a unique role in explosives as materials that are designed to be more sensitive than other materials but not too sensitive, such that they can initiate other, less sensitive materials. Common materials used in this application are lead (II) azide, lead styphnate, and tetrazene as sensitizer. However, these materials pose a serious environmental burden in the case of the lead compounds or have low thermal stability in the case of tetrazene. Researchers at Purdue University have developed a novel metal-free primary explosive material, TNTH, that helps improve the environmental sustainability of ammunition, as it doesn't contain lead and doesn't produce CO or CO2 and is thermally stable. This technology has the capability to replace current primary explosives.

Technology Validation:

THNT exhibits improved thermal stability (209 degC) over tetrazene (150 degC). Upon an impact or friction, THNT has the behavior of deflagration without a loud detonation, meaning that while it can ignite from mechanical stimuli, it can be safer for primer use than tetrazene.

Advantages:

-Metal-free

-High thermal stability

-Green combustion

Applications:

-Civil and military ammunition manufacturers

-Explosives

-Tetrazene replacement in primer materials

TRL: 3

Technology ID

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Category

Chemicals & Advanced Materials/Green & Bio-Based Chemistry

Aerospace & Defense/Defense Electronics & Surveillance Technologies

Chemicals & Advanced Materials/Materials Processing & Manufacturing Technologies

Further information

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