



Energetic Potting Material: enabling self-destruction of sensitive electronics, valuable data

Technology marketing summary:

Electronics such as printed circuit boards, processors, logic circuits, etc., are protected from vibration, moisture, corrosion and other potential damage by being coated or encapsulated with “potting” material. Conventional materials for potting electronics include chemically inert, unreactive solid or gelatinous compounds such as silicone or epoxy. Although potting material would slow down access to information and sensitive electronics stored within the potted electronic device if it falls into the wrong hands, a determined and skilled

adversary might be able to access some of the electronics and data.

At Idaho National Laboratory, scientists have found a way to protect electronics and data located on devices that have been lost or stolen, or have become obsolete. INL researchers developed a patent-pending energetic potting material that will ignite upon command and burn until the potted electronics are destroyed and data on them is inaccessible.

Technology description:

Following a conformal coating applied to the electron-

ics, energetic potting material made of a halogenated urethane binder mixed with a metal fuel is applied to the device and allowed to set up. This energetic potting material will protect the device during normal use just as conventional potting material would. But when the device is no longer needed, or has been stolen or lost, application of sufficient activation energy will initiate reaction of the energetic components and destroy the material and device. Once the material is ignited, halogens from the halogenated urethane binder will exothermically react with metals to form haloge-

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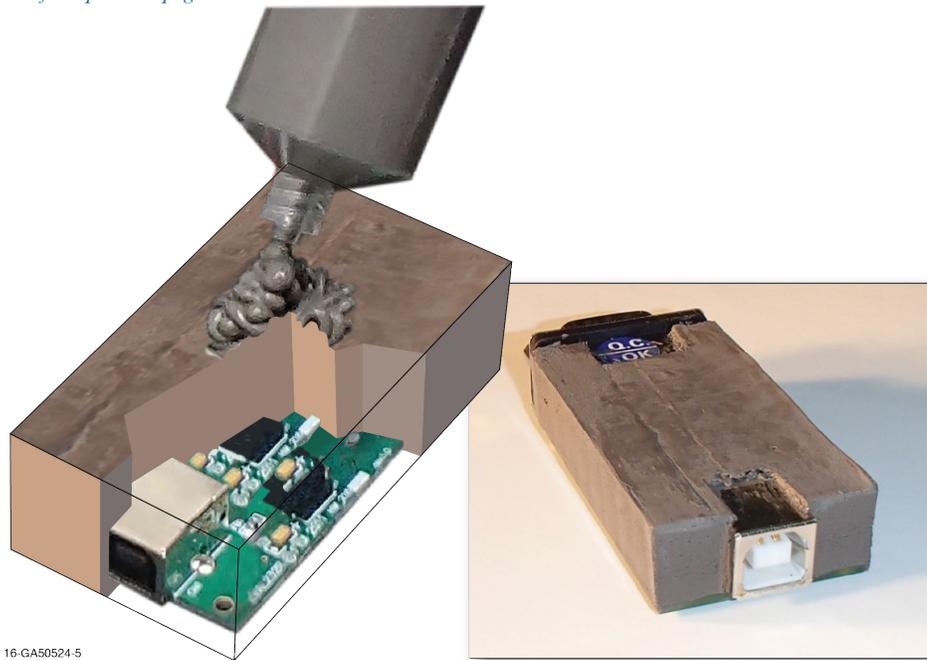
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nated metals. Heat released during formation of those halogenated metals, reaching temperatures up to 2400 degrees Celsius, will completely destroy the potted device and critical components.

The energetic potting material could be ignited by a variety of means: hot bridge wire initiator, semiconductor bridge initiator, exploding foil initiator, explosive bridge wire initiator, or a solid-state electro-explosive device.

Ignition and destruction of a device protected by INL's energetic potting material could be set to be triggered by a signal indicating that an unauthorized user is attempting to access the device (such as a set number of incorrect password attempts). The trigger could also be in response to the device housing being opened.

Technology benefits:

- Complete destruction of sensitive electronics and data.
- Prevention of information/technology falling into unauthorized hands.

Applications:

Military, police, government
Personal electronics
Unmanned aerial vehicles and robotics