Esterline
Defense Technologies

# Granular Pyrophoric Infrared Signature Material

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# Introduction

- Infrared imaging technology has been widely adopted in many defense applications.
- Some IR technologies are passive.
- Others require an active source of infrared radiation to be applied to the object of interest.
- Today, Esterline will discuss an infrared radiation emitting material for just that purpose.

# Material Description

- This material will be granular in form, porous, and dark grey in color.
- Grain size ranging from 75 to 250 microns.
- The material itself is activated pyrophoric metal.
- Initiated by contact with an oxidizer, most likely atmospheric oxygen upon deployment.
- Material must be isolated from all oxidizers until activation.
- This isolation will be accomplished by material packaging.

# Material Description

- Activation to be accomplished by deliberately failing the material's packaging.
- Ambient oxygen initiates the emission of infrared radiation.
- The material reaction temperature and the duration of reaction can be controlled.
- Not affected by temperature extremes or thermal shock.

# Material Description

- The emission of radiation in the visible spectrum is also available if desired.
- Signatures can range from infrared only (covert), to combined visual and infrared.
- In covert form, it can be seen only by NVGs or Thermal Targeting systems.
- In combined form, it also provides an unambiguous visual indication that can be seen at great distances.

# Material Performance

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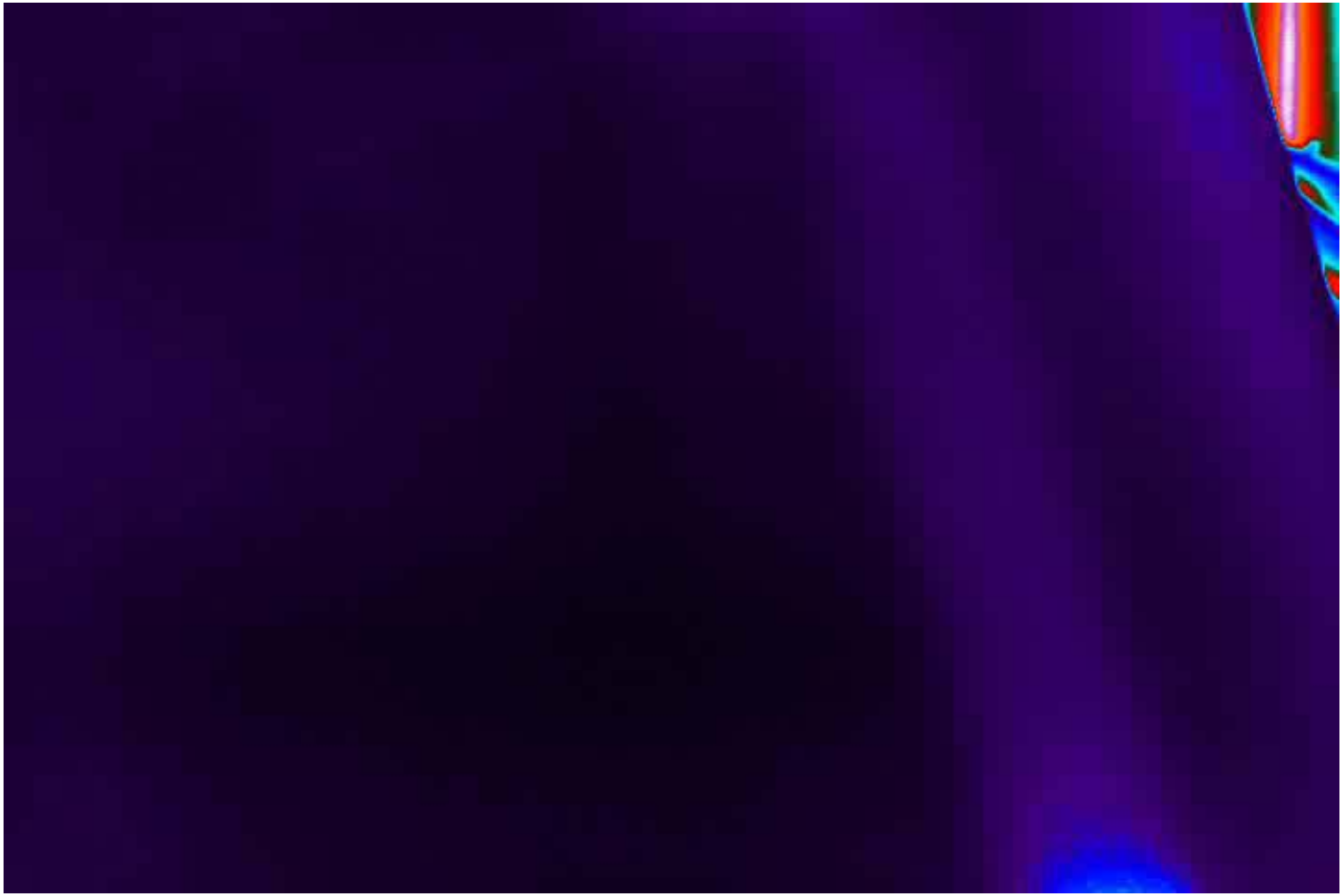

# Material Performance

# How the material is made

- Mix the metals together.
- Perform the intermetallic reaction.
- Crush and grind the material.
- Chemically remove one of the metals.
- Dry
- Classify particle size: dispersion, temperature, duration.
- Finalize desired output signature if necessary.
- Load, assemble, and pack the material.

# How the material is made

# Applications

- Possible uses for this material include:
  - Night time target practice ammunition impact marking.
  - Covert target marking.
  - Covert distress signaling.
  - Other marking or signaling applications.
  - ???

# Applications

- When used as a night time target practice ammunition payload, the material
  - Is environmentally benign, “green” ammo.
  - Does not require a fuze.
  - Produces no “dud” rounds that cause expensive cleanup and delays associated with traditional energetic material payloads.
  - Can be seen at distances in excess of 1,000 meters.
  - Is a safe and cost competitive alternative to existing technologies, and is available for testing today.

# Summary

- Esterline has developed a new material that offers many advantages over current payloads.
  - Environmentally friendly
  - Flexible and cost effective
  - Good tactical simulation characteristics
  - It can be used in a wide variety of applications from training to search and rescue.
- Esterline looks forward to applying this payload in a number of ammunition applications.

# Questions?

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