Intumescent Paint as a Passive Protection Method Against Lithium Battery Fires

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Background

• A very effective fire retardant
• Used widely in the construction industry
• It reacts to the heat and acts as a thermal barrier
  – swells up and reflects the heat away from the underlying substance
Setup

Exposed to an open flame

Exposed to radiant heat

Coated metals and corrugated cardboard with intumescent paint
Results From Open Flame
Results From Radiant Heater
Future Work

- Cartridge Heater surrounded by 4 Lithium-ion batteries.
- Wired with thermocouples to record the temperature.
- Analyzed the propagation of thermal runaway using different materials as separators
Results
Conclusions

- Effectively reflects the heat with coated metals.
- Delays the effects of fire and heat temporarily with coated cellulose based materials.
- The intumescent paint only delayed the batteries from going into thermal runaway, as predicted from the tests with the open flame and radiant heat.