

What is a smart firewall?

The smart firewall design provides a reliable approach to quench TR propagation in large-format LIBs, which can also be suitable for other dynamically adaptive thermal-protection applications for oil tanks, space exploration, and firefighting equipment. 1. Introduction

Are smart firewalls suitable for Next-Generation Lib packs?

Since the triggering temperature for protection is adjustable, our strategy for the design of smart firewalls holds enormous promise for next-generation safer LIB packs, and is also suitable for other practical applications with similar TR hazards, such as oil tanks, firefighting equipment, energy storage systems, and spacecrafts.

What is the enthalpy of a smart firewall?

The SCCS has the highest enthalpy of 2.56 kJ g⁻¹, because additional heat is absorbed by the precipitation of CaCl₂. These results indicate that in contrast to pure thermal insulation materials, the prepared smart firewall is better equipped with a heat absorption/cooling function.

Can a smart firewall prevent tr propagation in high-energy battery modules?

The repeatability of the blocking effect was verified by another two similar groups of experiments (Fig. S18). Thus, a 1-mm-thick smart firewall with multilevel insulation mechanism can ensure the prevention of TR propagation in high-energy battery modules.

How much heating power does a firewall have?

The maximum heating power is up to 53 kW calculated by differentiating the temperature profile (Fig. S16). However, the firewall successfully stopped the TR propagation by significantly reducing the highest temperatures to 660 °C with the help of the endothermic phase change process.

Can a smart firewall prevent tr propagation in a Lib module?

However, quenching TR without side effects still remains a challenge. Herein, we delivered an ultrathin smart firewall concept for avoiding the TR propagation in a LIB module.

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