Fire and Explosion Suppression for Newly Developed Electrochemical Storage Materials

MXenes are a newly discovered class of two-dimensional transition metal carbides, nitrides and carbonnitrides. They are emerging materials for electrochemical storage and possible use in lithium-ion batteries for applications such as cell phones and electric vehicles. However, their practical applications are currently limited by challenges with manufacturing, and fire and explosion safety.

Competitive advantage

- MXene is an emerging material with outstanding electronic properties and large surface areas ensure the inherent advantages as the electrode for electrochemical energy storage.

Impact

- Enhanced safety of next generation electrochemical materials
- Rechargeable batteries with higher energy density

Successful applications

- Development of a highly thermally-insulated three-dimensional architectured composite structure comprising epoxy, graphene and hydroxylated boron nitrides nanosheets
- Reinforcing the fire resistance properties of glass fibre using phosphorous-containing silane coupling agent

Capabilities and facilities

- Collective fire testing facilities including cone calorimeter, horizontal and vertical fire spread (UL94) and oxygen index
- Access to neutron beam diffraction facilities of ANSTO to study molecular morphological structure of MXenes
- Application of novel computation codes to predict the structural, mechanical, electrical, magnetic and thermoelectric properties of MXenes

More Information

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