

The Role of Explosion-proof and Flame-retardant Pigment in Smart Buildings



Summary of Content

Explosion-proof and flame-retardant pigments enhance fire safety, structural integrity, and resilience in smart buildings by preventing fire propagation and maintaining material performance under extreme conditions.

Fire Safety and Structural Protection

Flame-retardant pigments are critical in passive fire protection strategies for smart buildings. They are incorporated into coatings and building materials to slow fire spread, delay heat transfer, and preserve structural integrity, allowing safe evacuation and emergency response. For example, intumescent coatings containing ammonium polyphosphate (APP) expand when exposed to heat, forming an insulating char layer that protects steel frameworks and other load-bearing structures from reaching critical temperatures, reducing the risk of collapse during a fire . These coatings are essential in high-rise buildings, transportation hubs, and commercial centers where evacuation time is critical .

Mechanisms of Flame Retardancy

Flame-retardant pigments function through multiple mechanisms:

- Barrier formation: Pigments can form a protective char layer that insulates the underlying material from heat and oxygen, slowing combustion .
- Radical scavenging: Certain phosphorus-based pigments release radicals that neutralize highly reactive hydrogen and hydroxyl radicals, disrupting the flame propagation chain reaction .

Article Content

Flame Retardants for Building & Construction – Clariant

The ammonium polyphosphate flame retardants of our Exolit™ AP line provide key ingredients for treating steel and other substrates

The role of modern flame retardants in construction

By advancing fireproofing materials, modern chemistry plays a decisive role in building safety. In a world where fire risks can't be

Heat Resistant and Flame Retardant Coatings

Explore the recent developments in heat resistant and flame retardant coatings along with their types, raw materials

Innovative approaches to fire-resistant building materials: a review

Surface treatments and coatings, such as flame-retardant coatings and self-healing technologies, provide additional

Next-Generation Flame Retardant Materials: Design Strategies

Flame-retardant materials play a crucial role in enhancing fire safety across a wide range of industrial and consumer

Ultra-efficient, organic-inorganic hybrid, highly-intumescent fire ...

In this work, an organic-inorganic hybrid intumescent fire-retardant coating (MPDF 5) with FA as a synergist was

Flame-retardant coatings: Recent advances in materials,

With the growing emphasis on fire safety regulations globally, the demand for advanced flame-retardant coatings has

Flame-retardant surface treatments

As a result, researchers are developing flame-retardant surface treatments, which preserve the bulk properties of a

Innovative approaches to fire-resistant building materials: a review

Novel material compositions, including intumescent materials, nanocomposites, and bio-based alternatives, offer

Flame Retardant Coatings: Additives, Binders, and Fillers

In this review, the descriptions of several classifications of coating and their relation to thermal degradation and

Contact Us

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