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FIVE TRENDS SHAPING THE FUTURE OF THE FLAME-RETARDANT PLASTIC MARKET

The demand for flame-retardant plastic is growing due to its increasing application in industries such as aerospace and defense, transportation, electrical and electronics, wire and cable, pipes and tanks, marine, building and construction, and others. Some of the key trends in the flame-retardant plastic market are the increasing focus on non-halogenated flame retardants in plastic,

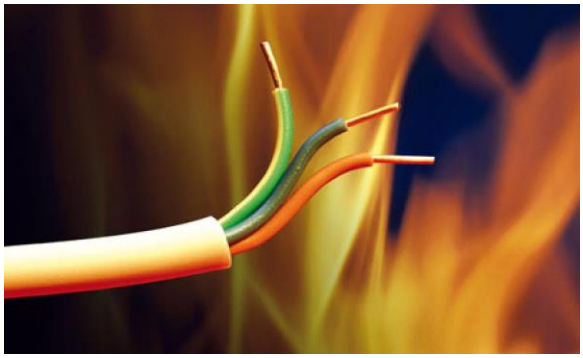
nanosized fire retardants in polymer composites, bio-based flame retardants for polymeric materials, intumescent flame retardants, and flame-retardant polyolefin and polyurethane plastics in the building and construction industry. The major growth drivers for this market are stringent government regulation around fire safety, growing consumption of flame-retardant plastics in the electrical and electronic market, and increasing demand from the halogen-free wire and cable market.

The flame-retardant plastic market is divided into several segments, such as PVC, polyolefin, polyurethane, ABS, PC, PA, PBT, epoxy, phenolic, polyester, vinyl ester, and others. Key players in the flame-retardant plastic market, include BASF, DowDuPont, Sabic, LyondellBasell, Mitsui Chemicals, Sumitomo Chemical, Huntsman, Hexion, and Momentive. These have been working on different strategies to drive sales using highly influential marketing approaches; however, as we examine the challenges and opportunities ahead in this market, companies can benefit from a strategy of developing non-halogenated flame retardants for use in plastic and bio-based flame retardants for polymeric materials, along with the key target market trends we have identified. Lucintel predicts the global flame-retardant plastic market will be valued at $55.0 billion by 2024, with an expected CAGR of approx. 4.0% between 2019 and 2024.

Lucintel identifies five trends set to influence the global flame-retardant plastic market. Most of the industry players and experts agree that these five trends will accelerate developments in the flame-retardant plastic industry in the near future. In terms of the widespread knowledge about the flame-retardant plastic market already on the horizon, there is still a lack of unified perspective on the direction the industry is moving to proactively address developments. To help bring more clarity to this gap, our study aims to provide insights concerning the direction that changes are taking and how these changes will impact the flame-retardant plastic market.

1. Increasing Focus on Non-Halogenated Flame Retardants in Plastic

Non-halogen flame retardants include phosphorus, nitrogen, silicone, boron, zinc, iron, and aluminum-containing flame retardants. Non-halogen flame retardants require a higher load level, and often need additional adjustments to maintain the mechanical properties of the plastic. Some



environmentally friendly non-halogenated flame retardant additives, such as ATH and organo-phosphorus, have gained significant popularity given their benefits and low cost. Many of the developed countries in North America and Europe are taking initiatives to ban the use of hazardous chemicals in any given product, considering the lethal effects on humans and the environment. Hence, the industry is witnessing a major shift from halogenated (chlorine and bromine-based) flame retardants to non-halogenated flame retardants, and the demand for these is being driven by safety standards.

2. Nanosized Fire Retardants in Polymer Composites

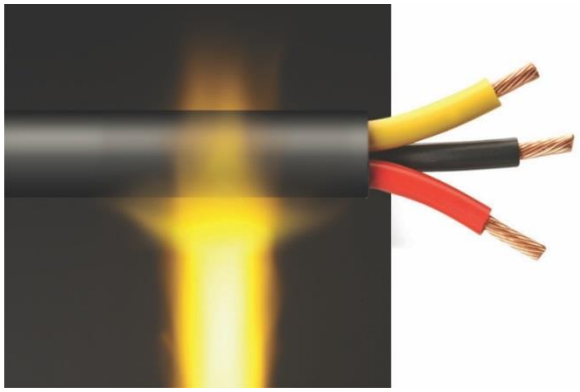
With the advent of nanotechnology over the past few decades, the prospects for nano-scale fillers in polymer-based composites in flame-retardancy applications have progressed rapidly. Although nanofillers do not inherently show excellent fire retardance, incorporation of low amounts of them in polymer composites tends to provide drastic improvement in thermal stability, the amount of smoke release, peak heat release rate, and the speed at which flames spread throughout the nanocomposites.

The main mechanism of fire retardancy for nanocomposites, which happens in the condensed phase, depends on the structure and chemical composition of the nanofiller. The presence of nanofillers in polymer matrix can alter the overall response of nanocomposites during exposure to flame. The common nano flame retardants in polymer composites include metallic particles, nanoclays, bio-based fillers, and others.

3. Bio-Based Flame-Retardants for Polymeric Materials

Bio-based flame retardants are grabbing their share of the catalogue of flame-retardant formulations. Bio-based flame retardants present growth opportunities for the next generation of flame retardants due to their sustainability, environmental benefits, and comparable efficiency when assessed against their current non-bio-based counterparts. Lignin-derived bio-based flame retardants are being aimed toward high-performance sustainable polymeric materials. Thanks to lignin's unique aromatic structure and high charring capability, recent years have witnessed the great flame-retardancy potential of pristine lignin and its derivatives in a wide range of polymeric materials.

4. Intumescent Flame Retardants



Intumescent flame retardants (IFRs) are considered one of the most promising eco-friendly flame retardants due to their advantages of relatively high efficiency, low smoke, and low toxicity. Typical IFRs are comprised of three major components: an acid source, a carbonizing source, and a foaming or blowing source. FIFRs should decompose at a temperature lower than the thermal degradation temperature of the polymer matrix. The acid source can be one of phosphoric acid, sulfuric acid, boric acid, and halides, as well as their derivatives; the carbonizing source mainly includes pentaerythritol (monomer, dimer, trimer), sorbitol, mannitol, dextrins, starch, phenol-

formaldehyde resins, and char-forming polymers like PA-6, PU, and PC. The blowing source (agent) is primarily nitrogen-containing compounds, such as urea, urea-formaldehyde resin, melamine, dicyandiamide, and polyamides. Intumescent flame-retardant systems are FRs that can insulate materials during combustion through the formation of an expanded carbonized layer. A ZnO-intumescent flame-retardant system has been reported to be effective for flame retardancy in the polypropylene-ethylene-propylene-diene monomer (PP-EPDM) polymer blend.

5. Flame-Retardant Polyolefin and Polyurethane Plastics in the Building and Construction industry

The demand for flame-retardant polyolefin and polyurethane plastics in the building and construction industry is increasing due to growing use in interior applications such as insulation foam and sheets, window frames, intravenous tubing and flooring, lawn and garden tools, outdoor gratings, support brackets, furniture components, mattresses, furniture cushioning, bedding, and carpet underlays.

Strategic Considerations for Key Players in the Flame-Retardant Plastic Market

The flame-retardant plastic industry is dynamic and ever-changing. Successful industry players are necessarily masters of innovation, change, and adaptation. To retain this status, they need to be attentive to current trends. We believe there will be promising opportunities for flame-retardant plastics in the electrical and electronic, building and construction, transportation, wire and cable, pipe and tank, aerospace and defense, and marine industries. As per Lucintel's latest

market research report (Source: https://www.lucintel.com/flame-retardant-plastics-market.aspx), the flame-retardant plastic market is expected to grow with a CAGR of approx. 4.0% between 2019 and 2024, and reach $55.0 billion by 2024. This market is primarily driven by stringent government regulation around fire safety, growing consumption of flame-retardant plastics in the electrical and electronic market, and increasing demand from the halogen-free wire and cable market.

Whether you are new to the flame-retardant plastic market or an experienced player, it is important to understand the trends that impact the development process, as these trends as listed above will lead players to create long-term strategy formulation that will allow them to remain competitive and successful in the long run. For example, to capture growth, some of the strategic considerations for players in the flame-retardant plastic market are as follows:

- Flame-retardant plastic market players can increase their capabilities to develop environmentally friendly non-halogenated flame-retardant additives for plastic.
- Players can focus on bio-based flame retardants for polymeric materials due to their sustainability and environmental benefits, which are expected to lead future trends.
- Investment to increase competencies in the development of nano-scale fillers in polymer-based composites for flame-retardancy applications
- Research and development activities for development of low-cost flame-retardant plastics

Note: In order to gain better understanding, and learn more about the scope, benefits, and companies researched, as well as other details in the flame-retardant plastic market report from Lucintel, click on https://www.lucintel.com/flame-retardant-plastics-market.aspx. This comprehensive report provides you in-depth analysis on market trends and forecast, segment analysis, regional analysis, competitive benchmarking, and company profiling of key players. In addition, we also offer **strategic growth consulting** to meet your customized needs. We have worked with many PE firms and corporate customers in the process of their market entry and M & A initiatives.

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- Management comprised of PhDs, MBAs, and subject matter experts. Head quarter in Dallas, USA.

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