

Achieving flame-retardant properties without red phosphorus

- **LANXESS offers alternatives to polyamide 66 compounds containing red phosphorus**
- **Polyamide 6 and 66 compounds with halogen-free flame-retardant packages**
- **Excellent thermal and mechanical performance**

Cologne – Red phosphorus is an established flame-retardant additive for polyamide 66. Even small amounts of it are enough to provide thermoplastics with good fire-resistant characteristics with scarcely any impact on the mechanical properties. However, such compounds have recently undergone significant price increases, as both polyamide 66 base resin and red phosphorus have become more expensive. Consequently, specialty chemicals company LANXESS is noticing growing demand for high-performance alternative materials based on polyamide 6 and 66 that feature flame-retardant characteristics in other ways, particularly in the electrical/electronic and IT industries. “Our range includes suitable compounds with halogen-free flame-retardant packages that exhibit similarly effective flame-retardant properties and in some cases are even better. The polyamide 6 compounds in particular boast an excellent price-performance ratio,” explains Alexander Radeck, application developer in the High Performance Materials (HPM) business unit. Through its HiAnt service, LANXESS helps customers to meet the standards defined, for example, in requirement specifications and delivery specifications when they switch materials.

Potential for light colors, no contact corrosion

Unlike their counterparts containing red phosphorus, the compounds from LANXESS can be given any color, including light shades. This is a point in their favor as color is an important element in design and is used in many applications as a feature of component safety markings. A further strength of the compounds is that metals are

LANXESS AG

Contact:
Michael Fahrig
Corporate Communications
Spokesperson Trade & Technical
Press
50569 Cologne
Germany

Phone +49 221 8885-5041
michael.fahrig@lanxess.com

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much less prone to corrosion when they come into contact with their flame retardant additives in warm, moist environments. Moreover, the compounds are also easier to handle in terms of occupational hygiene.

Improved tracking resistance

Polyamide 66 compounds with flame-retardant mechanisms based on red phosphorus are usually available with glass fiber content of between 20 and 40 percent. Alternative materials to compounds with glass fiber content of 25 percent include Durethan AKV25FN04 polyamide 66 and especially Durethan BKV25FN04 polyamide 6. Both exhibit similar tensile moduli, strength at break and elongation at break, Charpy impact strength and densities. At 600 volts, their tracking resistance (comparative tracking index CTI A, IEC 60112) is somewhat higher. Durethan AKV25FN04 is particularly suited to applications that call for high heat distortion temperatures or V-0 classification at a specimen thickness of 0.4 millimeters in the UL 94 flammability test from US testing organization Underwriters Laboratories Inc. (UL). Durethan BKV25FN04 is classified under V-0 at a specimen thickness of 0.75 millimeters. Both compounds are f1-listed by UL (starting at 0.75 millimeters). This means that they are also suitable for components that will be outdoors and subject to the effects of water and UV radiation, such as connectors for photovoltaic systems.

Better flame-retardant properties

Durethan AKV30FN04 polyamide 66 and the Durethan BKV30FN04 and BKV45FN04 polyamide 6 compounds make excellent substitutes for polyamide 66 compounds containing added red phosphorus and glass fiber contents around 35 percent. All three materials attain better classifications in UL 94 testing, achieving V-0 standard (0.4 millimeters). Their thermal endurance (relative temperature index, or RTI) as per UL 746B is also higher. With 45 percent glass fiber reinforcement, Durethan BKV45FN04 meets stringent

LANXESS AG

Contact:
Michael Fahrig
Corporate Communications
Spokesperson Trade & Technical
Press
50569 Cologne
Germany

Phone: +49 221 8885-5041
michael.fahrig@lanxess.com

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requirements for strength and rigidity. With its outstanding flame-retardant properties, it passes the tests required by European standard DIN EN 45545 for fire protection on railway vehicles with the top grade of Hazard Level 3. This applies to components listed in requirement sets R22 and R23, such as choke coils.

Some halogenated compounds from LANXESS also constitute suitable and cost-effective alternatives to polyamide 66 types with red-phosphorus-based flame-retardant packages. Two such examples are Durethan AKV25F30 polyamide 66 and Durethan BKV25F30 polyamide 6. Their assets include better flame-retardant properties, which are evident in glow-wire testing on end products in line with IEC 60695-2-1 (glow-wire end product test, or GWEPT), for example.

LANXESS is a leading specialty chemicals company with sales of EUR 9.7 billion in 2017. The company currently has about 15,500 employees in 33 countries and is represented at 59 production sites worldwide. The core business of LANXESS is the development, manufacturing and marketing of chemical intermediates, additives, specialty chemicals and plastics. LANXESS is listed in the leading sustainability indices Dow Jones Sustainability Index (DJSI World and Europe) and FTSE4Good.

Cologne, February 18, 2019
mfg/rei (2019-00007e)

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LANXESS AG

Contact:
Michael Fahrig
Corporate Communications
Spokesperson Trade & Technical
Press
50569 Cologne
Germany

Phone: +49 221 8885-5041
michael.fahrig@lanxess.com

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News Release

Information for editors:

All LANXESS news releases and their accompanying photos can be found at <http://press.lanxess.com>. Recent photos of the Board of Management and other LANXESS image material are available at <http://photos.lanxess.com>. TV footage can be found at <http://globe360.net/broadcast.lanxess/>.

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LANXESS AG

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Michael Fahrig
Corporate Communications
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Press
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Germany

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Image



Services that LANXESS performs for its development partners include standard-compliant flame-retardant testing using methods such as glow-wire testing. These activities are part of the HiAnt service package that LANXESS offers customers to assist them throughout the entire development process for a component.

Photo: LANXESS AG