Non-halogenated Fire Retardant Polypropylene (NH-FRPP)

Environmentally friendly, lightweight, halogen-free fire retardant components with good mechanical properties are important requirements in many of today’s demanding applications.

It is known that several traditional fire retardants used in thermoplastics have failed to retain their mechanical properties mainly due to the very high levels of fire retardants needed to achieve the UL-94-V-0 fire rating. With halogens being phased out more environmentally friendly solutions are being sought.

Researchers at the University of Auckland have developed a non-halogenated fire retardant polypropylene (NH-FRPP) through an innovative new process to obtain UL 94-V-0 fire rating without any detrimental effect on mechanical properties.

The filler used in this innovation provides nucleation and good exfoliation that contributes to the good flexural modulus of these composites. The processing data of the blend was compared with 20% Glass Coupled polypropylene to achieve properties required for industrial application and the results show excellent processability of the FRPP with low energy consumption.

Key Aspects of the Technology
1. Doesn’t use halogens which are environmentally detrimental and are being regulated out.
2. Provides reduced wear and tear to all machinery as well as reduced health and safety issues.
3. Injection rate parameters compared with a standard 20% Glass Coupled PP show processing advantages in injection molding parameters of low melt viscosity, low filling time and low hydraulic pressure.
4. Flame retardant properties show that UL-94-V-0 is achievable with 1.5mm thickness samples.
5. Total filler content with fire retardant additives in NH-FRPP is only 30%, yet the flexural modulus of the sample is ~3GPa.

6. The Glow-Wire Ignitability Temperature (GWIT) - (IEC 695-2-13) is 950°C and the Glow Wire Flammability Index GWFI (IEC 695-2-12) - pass the test.
7. The specific gravity is 1.10, low compared to other filled PP giving cost benefits.

IP Position
UniServices has patents pending in New Zealand and the United States, and a granted New Zealand patent NZ590534. The patents have been filed as ‘fire retardant polypropylene’. See WO2012/099478 for a published copy of the patent application.

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