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FOR IMMEDIATE RELEASE: 13 January 2020
PR # SCAT-01-20

SUMITOMO INTRODUCES THREE NEW PES GRADES TO PAINT, COATINGS FORMULATORS

Polyethersulfone Offers Formulators Broader Options when Producing Coatings for Higher-Performance Applications, Water-Based Products

Phoenix, Ariz., U.S. — Polyethersulfone (PES), a high-performance engineering thermoplastic, has long been used — alone and in combination with other polymers — as the base for paint and coatings owing to its high thermal stability, chemical resistance, and surface hardness, plus superior adhesion to a variety of substrates, including glass, iron, stainless steel, aluminum, and aluminum alloys. To support the paint and coatings industry, Sumitomo Chemical Advanced Technologies LLC (*here*) has introduced three new PES grades to meet the needs of formulators.

SumikaExcel 4100P is the standard coating grade and 4100MP is the same material but is offered ground to a micron-powder, which enhances solubility and dispersion. A third grade, SumikaExcel 5003PS has been chemically modified to possess a large number of hydroxyl (-OH) end groups — on average 0.6-1.4 per 100 repeating polymer units — which, in turn, can be used to create cross-linked structures that further increase the material's already-good chemical resistance, surface hardness, and adhesion to metals. That makes it ideal for use for paint and coatings requiring higher performance in more aggressive environments. For organic solvent-based paints and coatings, typically formulators will select either the standard 4100P grade or — where a harder coating is needed — the functionalized 5003PS grade. For water-based paints and coatings, the 4100MP micron-powder grade is typically used owing to its finer particle size (available ground to powders with average particle sizes as fine as 15 μm) for easier mixing and dispersion in water-based solvents.

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Sumitomo Chemical Introduces 3 New PES Grades to Paint & Coatings Formulators
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PES is an amber-transparent, amorphous engineering thermoplastic known for its high mechanical properties, including high strength and impact resistance, low creep even at elevated temperatures and loads. Additionally, it offers excellent thermal stability, including long-term heat aging and performance at elevated temperatures[1], low warpage (owing to the complete absence of crystallization), high dimensional stability, and low coefficient of linear thermal expansion (CLTE) over a broad temperature range. The polymer also provides superior stress-crack and good and broad chemical resistance[2], particularly for an amorphous thermoplastic.

Other properties of PES that are beneficial in the paint and coatings market include the material's stability even after long periods of use in air at temperatures up to 250°C and under conditions of repeated heating/cooling cycles (from 0°C to 250°C to 0°C again); its excellent hydrolysis resistance under humid conditions or in water; its superior film-forming properties, which provide excellent adhesion as well as protection to substrate materials; its high and inherent flame retardance without need for flame-retardant additives; and its excellent transparency that does not change the appearance of the base material. Additionally, the material meets all U.S. Food & Drug Administration (FDA) requirements for food-contact applications and does not support microbial growth.

Since PES also has an ability to modify the surface properties of substrates, it not only adheres well to the substrate material itself, but it functions as a binder to ensure that other components in the paint/coating also bond to the substrate. That makes PES highly desirable as a corrosion-protection coating for metals in the oil & gas industry and for non-stick surfaces (in combination with fluoropolymers like polytetrafluoroethylene (PTFE)) for cookware.

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[1] PES has the highest thermal resistance among amorphous thermoplastics. Depending on grade selected, properties include: glass-transition temperature (T_g) to 225-230°C, continuous-use temperature to 200°C, and distortion temperature under load (DTUL) to 215°C @ 1.8 MPa.

[2] PES is resistant to hot water (to 180°C), acids, bases, gasoline, ethanol, oil, grease, fluorine, cleaning solvents, and chlorofluorocarbons. It can be used over a broad percent-hydrogen (pH) range from 0-13. However, it is affected by polar solvents like acetone and chloroform.

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In the non-stick cookware segment, which is growing in popularity with new appliances such as air fryers, PES often competes with polyamideimide (PAI), polyphenylene sulfide (PPS), and polyetherimide (PEI). Versus thermoset PAI, PES is more affordable and far easier to process. Versus thermoplastics like PPS and PEI, PES offers higher surface hardness and higher glass-transition temperature (T_g), although PPS has a slightly higher melting temperature (T_m).

Sumitomo offers PES in pelletized form for injection molding, extrusion, and film processes, and in powder form for cast films, filtration membranes, adhesives, and as an impact-modifier for carbon fiber-reinforced epoxy composites. PES grades are used in the aerospace, automotive, electrical/electronics, medical-device, and food-handling industries.

Within the plastics industry, Sumitomo Chemical is unique as the world's sole PES supplier maintaining two dedicated PES polymerization facilities (in Chiba and Ehime, Japan). This eliminates the possibility of cross-contamination with other polymers — an extremely important requirement in industries like aerospace and medical equipment. It also simplifies the supply chain for processors and OEMs.

Sumitomo Chemical Advanced Technologies LLC, formerly called Sumika Electronic Materials and a wholly owned subsidiary of Sumitomo Chemical Co., Ltd., is a leading manufacturer of liquid crystal polymer (LCP), polyethersulfone (PES), and high-performance alloy resins. The company serves as the U.S. base of operations and customer support for Sumitomo Chemical's photoresist, epitaxial wafers, and engineering plastics businesses and is certified to ISO9001:2008* and ISO14001:2004* standards. For more information, see **www.sumikamaterials.com** or call +1.602.659.2500.

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Phoenix, Ariz., U.S. — Polyethersulfone (PES), a high-performance engineering thermoplastic, has long been used — alone and in combination with other polymers, such as polytetrafluoroethylene (PTFE) — as the base for non-stick cooking surfaces for housewares. In addition to excellent adhesion to iron, stainless steel, and aluminum and its alloys, PES offers high thermal stability and excellent surface hardness — properties that help enhance the longevity of cookware and ease of cleanup after use. Sumitomo Chemical Advanced Technologies LLC (*here*) has introduced three new PES grades to paint and coatings formulators.

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