Polymer/Clay Nanocomposites

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High modulus poly(ethylene terephthalate) (PET)/layered silicate nanocomposites were prepared by employing a novel reactive compatibilizer, 10-[3,5-bis(methoxycarbonyl) phenoxy]decyltriphenylphosphonium bromide, which was designed to link the layered silicate to the PET matrix through covalent and ionic bonds. The compatibilizer could be intercalated into the interlayer of the expandable fluorine mica. The PET/layered silicate nanocomposites were obtained through the polymerization of bis (2-hydroxyethyl) terephthalate in the presence of the intercalation compounds. The composites were characterized by X-ray diffraction, polarization microscopy, and flexural tests. The obtained nanocomposites showed a 70% higher flexural modulus than a raw PET at maximum.

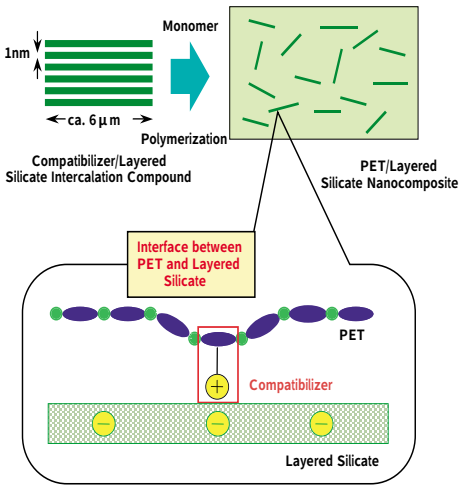

Illustration of PET/Layered Silicate Nanocomposite

A Potential Ability of Flame Spraying

- The Successful Synthesis of Spherical Filler-sized Aluminum Nitride Powder -

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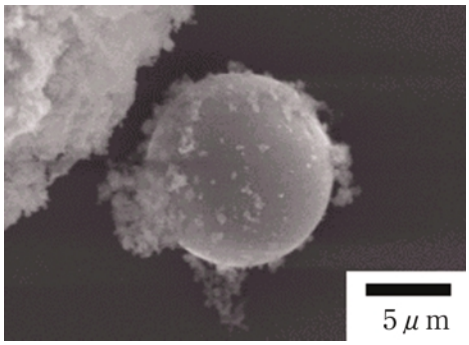
The new rapid synthetic-route was investigated as a method for manufacturing powders of the aluminum nitride (AlN) & oxynitride (γ-AlON etc.) via flame spraying. Our targeted size of the AlN filler used to manufacture via direct-nitridation to date. However, the resultant had an angular shape mostly, which was against the high-density packing. The spherical filler-sized AlN was prepared via flame spraying. The synthetic mechanism was studied from the viewpoint of chemical reactions in the Al-O-N ternary systems. The current understanding of this new synthesis affirms its potential for providing a high-yield processing rather than the previous gas-phase and solid-state reactions.



Scanning electron microphotograph of a synthesized AlN powder via flame pyrolysis.