

International Conference on

Industrial Chemistry

June 27-28, 2016 New Orleans, Louisiana, USA

Effect of nanosized layered double hydroxide on flammability, thermal and optical properties of polypropylene

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Nanosized copper-aluminum layered double hydroxides (Cu-LDHs) and Nickel-Aluminum layered double hydroxides (Ni-LDHs) were synthesized using co-precipitation method. LDHs were organically modified by long chain sodium stearate. Polypropylene (PP)/ layered double hydroxides (LDHs) and Polypropylene (PP)/organically-modified nanosized layered double hydroxides (m.Cu- LDHs or m.Ni-LDHs) were prepared by the melt bending of the PP with either LDHs or m.LDHs without any other additives. Thermal stability properties of PP/LDHs composites were also studied by thermogravimetric analysis (TGA). Mechanical properties of the PP/LDHs composites, tensile strength and modulus of elasticity were investigated. The flammability properties were investigated using cone calorimeter test. Intercalation of modified LDHs was determined by XRD in the presence of stearate. Modified LDHs showed a good disperability in PP matrix. Thermal stability of PP has been improved up to 6 % using m.Ni-LDHS. Unmodified and modified LDHs decreased the fire growth rate of PP from 10.8 kW/m².sec to 4.1kW/m².sec and 4.5 kW/m².sec. With increasing the percentage of m.Cu-LDH which added to PP, Eg shifted to be located in the semiconductor materials range. The values of Eg are in the range reported for the high efficient photovoltaic materials. So, the present composites could be considered potential materials for harvesting solar radiation in solar cell applications.

Biography

M Sh Zoromba has completed his PhD from TU Clausthal University of Technology, Germany. He has published more than 26 papers in reputed journals. He has supervised more than 10 PhD and Master students.

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