



**PREPARATION, CHARACTERIZATION AND FLAMMABILITY OF POLYPROPYLENE (PP)/LAYERED
DOUBLE HYDROXIDE (LDH) NANOCOMPOSITES**

De-Yi Wang ¹, Andreas Leuteritz ², Udo Wagenknecht ², Gert Heinrich ²
¹Sichuan University, China & Leibniz-Institut für Polymerforschung Dresden e.V.

²Leibniz-Institut für Polymerforschung Dresden e.V.

wang@ipfdd.de

Polypropylene (PP) as one of the synthetic polymers is widely applied for engineering material, electronic cases, interior decoration, and so on. Due to its high flammability, in many of these applications there are severe risks of fire related causalities. To improve the fire retardancy of PP, in this report, a series PP/layered double hydroxide (LDH) nanocomposites were prepared by melt compounding directly. Several types modified LDHs (MgAl-LDH, ZnAl-LDH, CoAl-LDH, NiAl-LDH) were synthesized by one step self-assembled method. The structural characterizations of PP/LDH nanocomposite were investigated by wide angle X-ray scattering (WAXS) and transmission electron microscopy (TEM). Their flammability behaviors were studied by microscale combustion calorimetry (MCC) and thermal behaviors were investigated by thermogravimetric analysis (TGA). The MCC results present that introduction of LDH into PP can effectively decrease the specific heat release rate (HRR), the heat release capacity (HRC), and total heat release (THR), indicating that the fire retardancy of nanocomposite has been improved. Interestingly, different type LDH at the same additive loading showed significantly different fire retarding behavior for PP, which could correspond to the different catalytic capability on carbonization during polymer thermal decomposition for various LDHs.