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CHAR EFFECT OF INTERLAYER MOLECULE IN POLYOLEFIN/LDH NANOCOMPOSITES

B.Kutlu [a,*], D. Wang[a,b], A. Leuteritz[b], U. Wagenknecht[b], G. Heinrich[b]

[a] *Leibniz Institute of Polymer Research Dresden, Hohe Strasse 6, D-01069, Germany and* [b] *Center for Degradable and Flame-Retardant Polymeric Materials (ERCEPM-MoE),College of Chemistry, State Key Laboratory of Polymer Materials Engineering, Sichuan University,Chengdu 610064,China*

**Corresponding author: kutlu@ipfdd.de*

Layered double hydroxide (LDH) is an important class of nanoclays and investigated in different fields such as heterogeneous catalysis, bioscavengers, waste water management or nanocomposites. An intrinsic flame retardant, LDH can serve in polyolefine-LDH nanocomposites as an environment-friendly flame retardant producing char residues at high temperatures. The modification of LDH is a pre-requisite to improve its dispersion in the polyolefin matrix before using as a filler. In the presented work, several dye molecules were employed as LDH modifiers since dye molecules offer a reliable char source at high temperature. Several polyolefin/LDH nanocomposites were prepared by melt compounding. Assembly of dye molecules in the galleries of inorganic LDH can overcome the incompatibility of LDH and matrix polymer due to unpolar character of matrix and also the narrow interlayer distance of LDH not allowing diffusion of polymer. Dye molecules, in the meantime, also can provide high amount of char residues, which will be beneficial to improve the flame retardancy of polyolefin composites. Char formation of LDH modifications at high temperatures including different dye molecules and also a common successful modifier, SDBS, was investigated. All the polyolefin/ dye molecules modified LDH nanocomposites showed higher thermal stability, high char residues at high temperature and good flame retardancy.