Chinese Journal of Chemistry 2006 24 (10): 1342-1345 ISSN: 0567-7351 CN: 31-1320/06

Full Papers

熔融插层法制备**LLDPE/MgAl-LDH** 剥离型纳米复合材料及其热性能研究

杜隆超,瞿保钧*

中国科学技术大学火灾科学国家重点实验室, 高分子科学与工程系, 合肥 230026

收稿日期 2005-9-7 修回日期 2006-6-10 网络版发布日期 2006-12-14 接受日期

摘要 采用十二烷基硫酸根离子部分取代镁铝层状双氢氧化物(MgAl-LDH)层间硝酸根离子得到有机改性的MgAl(H-DS) LDH，然后将线性低密度聚乙烯（LLDPE）熔融插层进入MgAl(H-DS)层间得到LLDPE/MgAl-LDH剥离型纳米复合材料。样品用傅立叶变换红外光谱，X射线衍射(XRD)，离子色谱，透射电镜(TEM)，热重分析(TGA)进行了研究。有机修饰的MgAl-LDH (00l) XRD衍射峰的消失和TEM观测表明MgAl-LDH纳米片层随机分散在LLDPE基体中。相比LLDPE样品，LLDPE/MgAl-LDH纳米复合材料的TGA曲线显示其在210到370 ℃之间具有较快的成炭特征，在370°C以上具有更高的热稳定性。以40％失重作比较点，含有10 wt% MgAl(H-DS)的纳米复合材料的降解温度比纯LLDPE高42 ℃。

关键词 聚合物/层状双氢氧化物纳米复合材料 剥离 熔融插层 热性能

分类号

Preparation of LLDPE/MgAl-LDH Exfoliation Nanocomposites with Enhanced Thermal Properties by Melt Intercalation

DU Long-Chao, QU Bao-Jun*

State Key Laboratory of Fire Science and Department of Polymer Science and Engineering, University of Science and Technology of China, Hefei, Anhui 230026, China

Abstract The interlayer surface of MgAl layered double hydroxide (MgAl-LDH) was modified by exchanging about half of the interlayer nitrate anions by dodecyl sulfate anions (DS) to get MgAl(H-DS) LDH, and then the MgAl(H-DS) was melt intercalated by LLDPE to get the LLDPE/MgAl-LDH exfoliation nanocomposites. The samples were characterized by Fourier transform infrared (FTIR) spectroscopy, X-ray diffraction (XRD), ion chromatography, transmission electron microscopy (TEM), and thermogravimetry analysis (TGA). The nanoscale dispersion of MgAl-LDH layers in the LLDPE matrix was verified by the disappearance of (00l) XRD reflection of the modified MgAl-LDH and by the TEM observation. The TGA profiles of LLDPE/MgAl-LDH nanocomposites show a faster charring process between 210 and 370 ℃ and a higher thermal stability above 370 ℃ than LLDPE. The decomposition temperature of the nanocomposites with 10 wt% MgAl(H-DS) can be 42 ℃ higher than that of LLDPE at 40% weight loss.

Key words **Keywords** polymer/layered double hydroxide nanocomposite exfoliation melt intercalation thermal behavior

DOI:

通讯作者 瞿保钧 qubj@ustc.edu.cn