

研究论文

含水Mg(OH)₂/聚苯乙烯复合材料的制备和阻燃性能

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摘要: 以Mg(OH)₂粒子稳定的Pickering乳液液滴为模板, 通过偶氮二异丁腈引发苯乙烯聚合, 制备出含水Mg(OH)₂/聚苯乙烯复合材料。用扫描电子显微镜观测了复合材料的形貌, 用氧指数仪测定了复合材料的氧指数。结果表明, Mg(OH)₂/聚苯乙烯复合材料中存在平均直径为155 μm的孔洞, 能够包裹一定质量的水。随着聚合温度的提高, 复合材料的含水量下降。含水复合材料由于具有水和Mg(OH)₂的双重阻燃作用, 氧指数显著高于Mg(OH)₂/聚苯乙烯复合材料, 但力学性能有所下降。

关键词: 复合材料 乳液 水 阻燃 聚苯乙烯

Preparation of Water-containing Mg(OH)₂/PS Composites and Their Flame Retardant Properties

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Abstract: Water-containing Mg(OH)₂/PS composites were prepared by a polymerization reaction with the droplets of a Pickering emulsion as template. The morphology of the composites was characterized, and the oxygen index of the composites was measured. The results showed that the Mg(OH)₂/PS composites had holes with an average diameter of about 155 μm, which served as reservoirs for water. With the increase of polymerization temperature, the amount of water in the composites decreased. The oxygen index of the composites was much higher than that of the ordinary Mg(OH)₂/PS composites, due to the dual flame retardant effect of water and Mg(OH)₂. However, the mechanical properties of the water-containing Mg(OH)₂/PS composites decreased.

Keywords: composites emulsion water flame retardant polystyrene

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- [1] DAI Xinhe, PENG Jing, ZHAI Maolin, QIAO Jinliang, WEI Genshuan, Preparation and characterization of transparent PS through gamma radiation polymerization, *Acta Polymerica Sinica*, 27(3), 403(2005)
- [2] JIANG Wenjun, LI Zhezha, ZHANG Chunxiang, FANG Jin, YANG Xujie, LU Lude, LIU Xiaoheng, Preparation of modified magnesium hydroxide and its flame- retardant application in PA66 composites, *Functional Material*, 41(3), 527(2010)
- [3] G.I.Titelman, Y.Gomen, Y.Keidar, Discolouration of polypropylene based compounds containing magnesium hydroxide, *Polym. Degrad. Stab.*, 77(2), 345(2002)
- [4] F.Laoutid, P.Gandon, J.M.Taulemesse, J.M.Cuesta, J.I.Velasco, A.Piechaczyk, Study of hydromagnesite and magnesium hydroxidebased fire retardant systems for ethylene-vinyl acetate containing organo-modified montmorillonite, *Polym. Degrad. Stab.*, 91(12), 3074(2006)
- [5] AN Jing, LU Rong, Study on effect of different filling of magnesium hydroxide on flame retardant of PE, *Technology and Development of Chemical Industry*, 39(4), 12(2010)
- [6] CHEN Yi, YANG Junhong, Study on the flameretardancy of nano Mg(OH)₂ and its composite in HDPE, *Journal of Hunan University of Technology*, 23(4), 43(2009)
- [7] LI Jun, TANG Guoyi, Progress on fabrication and surface modification of Mg(OH)₂ nanometer flame retardant, *Industrial Minerals and Processing*, 37(8), 27(2008)
- [8] YANG Ling, WANG Yongyi, Influence of magnesium hydroxide and red phosphorus on flammability properties of MVMQ/clay nanocomposite, *China Safety Science Journal*, (11), 83(2009)
- [9] (11), 83(2009)
- [10] A.P.Sullivan, P.K.Kilpatrick, The effects of inorganic solid particles on water and crude oil emulsion stability, *Ind. Eng. Chme. Res*, 41(14), 3389(2002)
- [11] J.G.Kahn, V.Schmitt, B.P.Binks, F.L.Calderon, A new method to prepare monodisperse Pickering emulsions, *Langmuir*, 18(7), 2515(2002)
- [12] R.Aveyard, B.P.Binks, J.H.Clint, Emulsions stabilised solely by colloidal particles, *Adv. Colloid Interface Sci*, 100-102, 503(2002-2003)
- [13] WANG Zhengzhou, QU Baojun, FAN Weicheng, LI Zhi, Studies on surface modifiers in Mg(OH)₂ flame retarded polyethylene, *Journal of Functional Polymers*, 32(1), 45(2001)
- [14] B.P.Binks, C.P.Whitby, Nanoparticle silica-stabilised oilin-water emulsions: improving emulsion stability, *Colloids Surf. A*, 253(1), 105(2005)

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2. 向红亮,黄伟林,刘东,何福善.29Cr超级双相不锈钢表面腐蚀XPS分析[J]. *材料研究学报*, 2011,23(4): 303-312
3. 刘侠和,吴欣强,韩恩厚.轻水堆结构材料在加锌水中的腐蚀行为研究现状与进展[J]. *材料研究学报*, 2011,23(4): 287-292
4. 李娜,王志平,纪朝辉,王振良.阳极化处理对复合材料用导电铝箔网层耐蚀性的影响[J]. *材料研究学报*, 2011,23(4): 342-345
5. 杨雨辉,肖伟龙,柴柯,吴进怡.碳含量和浸泡时间对碳钢热带自然海水腐蚀产物中细菌组成的影响[J]. *材料研究学报*, 2011,31(4): 294-298
6. 邵忠财 刘艳辉.用半连续法制备高交联度三维有序聚苯乙烯微球[J]. *材料研究学报*, 2011,25(4): 0-0
7. 肖代红 袁铁锤 贺跃辉.原位自生Ti-B-Si-C系复合材料的制备与表征[J]. *材料研究学报*, 2011,25(4): 0-0
8. 季金苟.纳米复合氟改性丙烯酸树脂超疏水自清洁涂层的制备[J]. *材料研究学报*, 2011,25(4): 0-0
9. 张满意,郭兴伍,杨海燕,王渠东,丁文江.水热条件下Mg-3Nd-Zn-Zr合金化学转化膜的研究[J]. *材料研究学报*, 2011,23(3): 233-238
10. 刘斌,张涛,邵亚薇,孟国哲,王福会.深海环境对纯镍腐蚀行为的影响 III-静水压力对纯镍点蚀机制的影响[J]. *材料研究学报*, 2011,23(3): 239-244

