

JOINT EVENT ON

5th International Conference on Bioplastics and 6th World Congress on Biopolymers

September 07-09, 2017 | Paris, France

Processing optimization and characterization for PLA/mgalcu-LDH/PVP composite microsphere

Shuhua Zhang^{1*}, Hongmei Zhang¹, Yang Chen¹, Juan Wang¹, Xiuxiu Han¹ and Weijun Liu²¹College of Chemistry and Chemical Engineering, Shanghai University of Engineering Science, China²College of Mechanical Engineering, Shanghai University of Engineering Science, China

In order to improve the mechanical properties of polylactic acid(PLA), PLA/MgAlCu-LDH/polyvinyl pyrrolidone(PVP) composite microsphere was successfully prepared on the basis of seminal emulsion polymerization with PLA and PVP as monomer, MgAlCu-LDH as intercalating agent. Design-Expert 8.5 software was employed to optimize the processing technology with two steps. Firstly, single factor was analyzed based on the mass fraction ratio of MgAlCu-LDH to PLA, PVP concentration and stirring speed range being 1/15~1/8, 1~2%, 800~1200r/min, respectively. Secondly, the interaction effects of three factors were discussed according to the analysis of the software. The results show that the influence factors to microspheres size were as follows: the stirring speed > the mass fraction ratio of MgAlCu-LDH to PLA > PVP concentration. The optimized processing technology of microspheres indicates that the mass fraction ratio of MgAlCu-LDH to PLA is 1/15, the concentration of PVP is 2%, the stirring rate is 1200r/min. The structure and morphology of the dried frozen composite microsphere were characterized by XRD, FT-IR and SEM. The intercalation of part of the PLA into the gap of MgAlCu-LDH would be responsible for the new peaks on XRD spectra of MgAlCu-LDH and the disappear peaks at 1750cm⁻¹, 1200cm⁻¹ assigned to C=O on FT-IR spectra of PLA, which proves PLA/ MgAlCu-LDH/PVP composite microsphere was successfully prepared. Interestingly, some tinny channels resulted from volatile solvent on the surface of microsphere may be benefit for biocompatible.

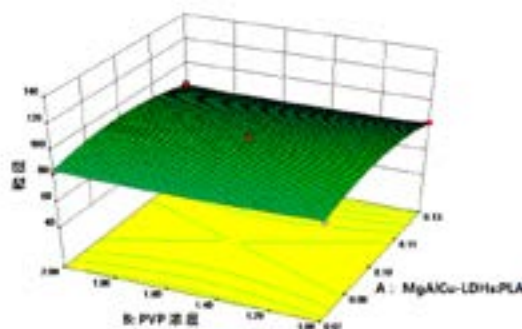


Figure 1: Response surface and contour plots of interrelated influence of mixed solvent and PVP concentration

Biography

Shuhua Zhang has completed his PhD from Harbin University of Science and Technology, and visiting studies from Lawrence Berkeley National Laboratory as a senior research scholar from September of 2013~ September of 2014. She is the associate professor of materials in polymer materials and engineering of Shanghai University of Engineering Science now. She has published more than 30 papers, an academic monographs and owned 4 authorized invention patents of China.

zhangsh@sues.edu.cn

Notes: