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Nano Roughening of Polyethylene Surface with Acrylic acid/Benzophenone via UV irradiation for Intelligent Packaging Application

ABSTRACT

Surface modification methods are used in several industries as biomedical, textiles, microelectronics, bioprocessing, and food packaging. Most commercial polymers surface are inert and hydrophobic in nature, they must be modified or treated prior to covalent attachment with desired compounds on their surface. Surface modification technology as UV irradiation has been used to introduce carboxylic acid functionality and to initiate radical graft polymerization of many compounds on polymer surface to improve wettability, printability, sealability or its adhesion to other materials. Benzophenone is the most wildly used as initiator for graft polymerization because of their ability to remove hydrogen and form reactive grafting sites on polymer surface. Acrylic acid is grafted monomers which can react with different compounds and introduce functionalities on grafted surface. The objective of this work is to investigate the effect of acrylic acid and benzophenone in mixed solvent via UV irradiation technique on nano scale roughness of polyethylene surface. The grafting efficiency, surface functionalization and nano scale roughness on PE surface will be investigated using fourier transform infrared spectroscopy (FTIR), contact angle measurement, and atomic force microscope (AFM). The expected results of hydrophilicity and desired functionality possibly used to enhance immobilization of azo dye as intelligent packaging application.

Keywords: Acrylic acid, Benzophenone, Intelligent packaging, Nano roughening, UV irradiation

Author: Ms WANNAWISAN, Nawaporn (Department of Packaging and Materials Technology, Faculty of Agro Industry, Kasetsart University, Bangkok, Thailand; Center for Advanced Studies in Agriculture and Food (CASAF), Kasetsart University, Bangkok, Thailand)

Presenter: Ms WANNAWISAN, Nawaporn (Department of Packaging and Materials Technology, Faculty of Agro Industry, Kasetsart University, Bangkok, Thailand; Center for Advanced Studies in Agriculture and Food (CASAF), Kasetsart University, Bangkok, Thailand)

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