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STUDY ON PHOTO-DEGRADATION OF MULCHING FILMS UNDER UV IRRADIATION

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Abstract

In this paper photo-oxidative degradation of degradable mulching films was studied. Low-density polyethylene (LDPE) films were denominated as 3# and 4# (containing 3.43% and 0.44% degradable masterbatch, respectively), They were exposed to different irradiation condition of i: ultra violet A irradiation (UVA), ii: ultra violet A and B irradiation (UVA-B), both at 58±2°C. The physical chemical property of the plastic film is influenced by factors in many aspects, especially the composition of the plastic film. The chemical and physical changes were measured by the carbonyl index (*CI*), viscosity-average molecule weight (*Mv*), differential scanning calorimetry crystallinity and mechanical properties. Incorporation of degradable masterbatch was effective in initiating the photo-degradation of LDPE in short span of time both. However, the deterioration of samples induced by UVA-B irradiation is worse than that by UVA irradiation. The *CI* of 3# LDPE film gets 0.11 by UVA irradiation, while the value displays 0.22 by UVA-B irradiation. The *Mv* of 3# LDPE film is lower than 5,000 after 400 hours at UVA-B irradiation, while the *Mv* of 3# LDPE film is lower than 5,000 after 1200 hours at UVA radiation.

Key words: low-density polyethylene, mulching film, photo-degradation, UV radiation

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