

## EFFECT OF PHOTO ACCELERATORS ON THE DEGRADATION OF POLYSTYRENE FOAM

**U. MEEKUM<sup>1</sup> and R. KENHARAJ<sup>2</sup>**

<sup>1</sup>School of Polymer Engineering, Institute of Engineering,  
Suranaree University of Technology, Nakorn Ratchasima, THAILAND, 30000

<sup>2</sup>Construction Technology Program, Faculty of Science and Technology  
Rajabhat Institute Udonthani, Muang Distric, Udonthani, THAILAND, 41000

E-mail: [umsut@ccs.sut.ac.th](mailto:umsut@ccs.sut.ac.th)

### EXTENDED ABSTRACT

The Polystyrene(PS) foam has been widely used as food packaging and insulators. The former application has been commonly seen as take-away meal boxes. When it reaches to the end-users, it would be discarded to the environment as municipal solid waste(MSWs). It would readily undergo photodegradation if it were disposed in the open-air dumping. It would take months to be degraded in the natural condition. In the present of research study, the degradation rate of the PS-foam in open-air dumping and in the artificial exposure, using Standard weatherometer, were investigated. Benzoyl Peroxide and AIBN were used as photo accelerators. The concentrations of these chemicals were varied from 1% to 3% by weight. The decreasing in the number average molecular weight of the samples, characterized by GPC technique, were monitored as used to calculate to reaction rate. By using the degradation rate mathematical modeling the order of reaction( $\mathbf{b}$ ), rate constant( $k'$ ) and the half-life( $t_{1/2}$ ) of the photoreaction were obtained. The results showed that the  $\mathbf{b}$  was increased with the increasing of concentration of the accelerators. Vice versa, the  $k'$  were decreased. However, by considering the  $t_{1/2}$  it was found that the half-life to photoreaction using Peroxide as accelerator was slightly decreased when the concentration increased from 1% to 3%. Nevertheless, the value was significantly decreased when the AIBN was employed.

**Key words:** Polystyrene Foam, Photodegradation, Accelerators, Mathematical Modeling