Achieving Polymer Modification by the New Dimension of Reactive Extrusion

Rathanawan Magaraphan
Petroleum and Petrochemical College, Chulalongkorn University, Bangkok 10330
Polymer Processing and Polymer Nanomaterials Research Unit, Chulalongkorn University, Bangkok 10330
Phone +66 2218 4121, Fax +66 2215 4459, *E-Mail: rathanawan.k@chula.ac.th

Abstract

Extrusion has been used successfully in conveying polymer melts into the desired shapes. The reactive extrusion employed extrusion as a mean to process and chemically modify polymeric materials at the same time. Functionalization and (in-situ) compatibilization may benefit by this technique. A new approach of the reactive extrusion based on a physical initiation, so called plasma melt reactive processing was introduced and conducted at atmospheric condition. The plasma melt reactive processing was applied as a mean to alter polarity of the bulk hydrophobic polymer e.g. high density polyethylene. Its potential to alter polymeric structure was also revealed. The treatment time influenced on wettability, chemical, thermal, and mechanical properties of the modified polyethylene was studied by contact angle measurement, ATR, XPS, TGA and tensile testing.

Keywords: Reactive extrusion, Plasma melt processing, Polyethylene.