4036462 SCPO/M : MAJOR: POLYMER SCIENCE; M.Sc. (POLYMER SCIENCE)
KEY WORDS : POLYAMIDE 6/ POLYPROPYLENE/ MORPHOLOGY/ INDEPENDENT VARIABLES/ POLYMER BLENDS

ADISAKDI CHATATHANOM: THE INTERACTIONS BETWEEN COMPATIBILISER ACTIVITY UNDER MELT PROCESSING CONDITIONS AND THE MORPHOLOGY AND MECHANICAL PROPERTIES OF POLYAMIDE 6/POLYPROPYLENE BLENDS. THESIS ADVISERS: RICHARD A VENABLES, Ph.D., KRISDA SUCHIVA, Ph.D., ARUNEE TABTIANG, Ph.D., 147 p. ISBN 974-665-032-7

In this study, the activity of an *in-situ* formed block copolymer in a polyamide 6/polypropylene (PA6/PP) blend was investigated under melt processing conditions through the use of a factorial screening experiment. The independent variables selected were twin screw extruder screw configuration, screw speed, and compatibiliser concentration. The level of dispersion of the minor component in the blend and the dispersion stability were quantified through analysis of extruded and injection moulded specimens. It was found that for compatibiliser contents greater than 2.4 vol% and average stresses during compounding above 100 MPa that the ratio of the specific interfacial area between the PA6 and PP phases reached a constant value of around 90 μm^{-1}. This value corresponded to an average interfacial thickness of 11 nm.

The radius of gyration of the PP block in the *in-situ* formed PP-block-PA6 was estimated to be 12.9 nm, and hence was of comparable size to the interfacial thickness. It was inferred that the mixing was principally controlled by the quantity of *in-situ* formed PP-block-PA6 at the higher mixing stresses. During injection moulding a plasticisation energy of 7.5 MJm^{-3} at a channel shear rate of 52 s^{-1} was used; the nozzle shear rate was around 6,500 s^{-1}. Under these conditions, it was found that the largest domains produced during extrusion underwent the greatest change during injection moudling. For the highest compatibiliser content employed; i.e., 3.8 vol%, at average extrusion stresses greater than 100 MPa, the domain morphology was largely stable under the injection moulding conditions.