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Study of non-isothermal crystallization kinetics of polypropylene and acrylonitrile butadiene styrene (ABS) blends

Bader Albusairi

Kuwait University, Kuwait

Polypropylene (PP) is a semi crystalline polymer, has rapid cooling behavior and clogs parts of machinery when used in blow molding applications. Acrylonitrile butadiene styrene (ABS) is an amorphous polymer. When ABS is used in combination with PP at different concentrations, it can alter the crystallizing behavior of PP and improve its impact properties. In this research work, different macro kinetic models like Avrami, Tobin and Malkin have been applied to study the non-isothermal crystallization kinetics of the blend formed using PP and ABS. The data analysis was carried out using a direct fitting method and by using the solver optimization technique available in excel 2013. Tobin analysis was found to be effective in describing the non-isothermal crystallization kinetics of neat PP, ABS and blends of PP and ABS. The crystallization rate constants, activation energies and individual model constants are reported in this work. The results in general have indicated that the crystallization rate, crystal nucleation and growth during crystallization could be monitored through temperature and cooling rate control which lays the foundation to industrial manufacture of PP/ABS blends.

Biography

Bader Albusairi has completed his MSc and PhD from Lehigh University in Chemical Engineering. He is the Director of Guidance and Counseling Office at the College of Engineering and Petroleum at Kuwait University. He had previously served as the Director of the Office of Academic Assessment. He has published many papers in reputed journals especially in the field of Heat and Mass Transfer Modeling.

bbusairi@gmail.com

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