RHEOLOGICAL PROPERTIES OF EXTRUDED KENAF FIBRE/ HIGH DENSITY POLYETHYLENE COMPOSITES

Md. Salleh*, F., Hassan, A. and Yahya, R.

Polymer & Composite Materials Research Labrotary, Department of Chemistry, University Malaya, 50603 Kuala Lumpur

Abstract
Polymer matrix composite (PMC) is directed at using natural fibre as reinforcement material. The optimum extrusion condition for composite is very important to produce cheaper PMC with improved properties. High density polyethylene (HDPE) and kenaf fibre were melt mixed using a twin screw co-rotating extruder. The extrusion of 20% and 40% Vf kenaf fibre was conducted at two different screw speed of 80 and 120 rpm with two different die temperatures of 180°C and 185°C. The extruded composites were pelletized and tested for rheological properties. Dynamic frequency sweep (DFS) and steady shear flow (SSF) measurements were then performed. Rheological data on DFS measurements of 20% Vf kenaf fibre/HDPE composite, extruded at 120 rpm screw speed with 180°C temperature shows the highest value of complex viscosity, storage and loss modulus with almost Newtonian behaviour of SSF measurement at very low shear rate. Whereas, composite at 40% Vf kenaf fibre loading extruded at 80 rpm and 185°C show the highest value of complex viscosity, storage and loss modulus. In addition, SSF measurement at this condition decreased with increasing frequencies due to shear thinning. From these rheological data, it can be concluded that different fibre loading into a matrix presents different optimum extrusion conditions.

Keywords: kenaf fibre composites, extrusion, rheological properties, shear thinning, Newtonian behaviour

* Corresponding author.

E-mail address: asreen1929@yahoo.com