Development of kenaf-glass reinforced unsaturated polyester hybrid composite for structural applications

ABSTRACT

The main aim of this paper is to develop kenaf-glass (KG) fibres reinforced unsaturated polyester hybrid composite on a source of green composite using sheet moulding compound process. Unsaturated polyester resin (UPE) and KG fibres in mat form were used at a ratio of 70:30 (by volume) with treated and untreated kenaf fibre. The kenaf fibre was treated with 6% sodium hydroxide (NaOH) diluted solution for 3 h using mercerization method. The hybrid composites were tested for flexural, tensile and Izod impact strength using ASTM D790-03, ASTM D618 and ASTM D256-04 standards respectively. The highest flexural, tensile and impact strength were obtained from treated kenaf with 15/15 v/v KG fibres reinforced UPE hybrid composite in this investigation. Scanning electron microscopy fractography showed fibre cracking, debonding and fibre pulled-out as the main fracture mode of composites and kenaf treated 15/15 v/v KG reinforced hybrid composite exhibited better interfacial bonding between the matrix and reinforcement compared to other combinations.

Keyword: A. fibres; A. hybrid; B. debonding; D. fractography