

Recycling of Plastic Waste into Composites Using Kaolin as Reinforcement

Authors : Gloria P. Manu, Johnson K. Efavi, Abu Yaya, Grace K. Arkorful, Frank Godson

Abstract : Plastics have been used extensively in both food and water packaging and other applications because of their inherent properties of low bulk densities and inertness as well as its low cost. Waste management of these plastics after usage is troubling in Ghana. One way of addressing the environmental problems associated with these plastic wastes is by recycling into useful products such as composites for energy and construction applications using natural or local materials as reinforcement. In this work, composites have been formed from waste low-density polyethylene (LDPE) and kaolin at temperatures as low as 70 °C using low-cost solvents like kerosene. Chemical surface modifications have been employed to improve the interfacial bonding resulting in the enhancement of properties of the composites. Kaolin particles of sizes $\leq 90\mu\text{m}$ were dispersed in the polyethylene matrix. The content of the LDPE was varied between 10, 20, 30, 40, 50, 60, and 70 %wt. Results obtained indicated that all the composites exhibited impressive compressive and flexural strengths with the 50%wt. composition having the highest strength. The hardness value of the composites increased as the polyethylene composition reduces and that of the kaolin increased. The average density and water of absorption of the composites were 530kg/m³ and 1.3% respectively.

Keywords : polyethylene, recycling, waste, composite, kaolin

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