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Processing and Characterization of Rotomolded High-Density Polyethylene with Rice Husk Particles as Reinforcement

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Rotational moulding is a plastic processing technology used to manufacture large hollow products economically with short production runs. High-density polyethylene or HDPE is widely used for rotational moulding because of its excellent chemical resistance, high stiffness, good processability, and low cost. However, its application is limited due to its modest mechanical properties. This limitation can be overcome by the incorporation of fibres or fillers as reinforcement. In the present study, Rice Husk (RH) is used as the reinforcement filler. The different weight percentage of rice husk is added to HDPE and is roto moulded to get polymer composites. The physical, mechanical, morphological, and vibration damping characteristics are then studied to determine the effect of rice husk in the HDPE matrix. Mechanical properties were investigated as per ASTM standards, and the best values of tensile and flexural properties were obtained for the composite with 10% rice husk powder. The impact strength and hardness values were found to be less significant for reinforced composites. The Thermo Gravimetric Analysis (TGA) reported that the degradation of RH particles happens at 263 °C and hence the processing temperature of the composites is kept below this degradation temperature to get defect-free composites. The experimental modal analysis results proved that the incorporation of Rice husk particles improves the

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