

## Composites of polyethylene and polyurethane blended with rice residues derived silica

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### Abstract

Rice husks and rice straw are potential residues of rice production. Their composition consist a large amount of silica with other compounds such as cellulose, lignin, hemicellulose. In the refinery of these residues the separation of silica from these residues can provide high economic efficiency, and also solves the problem of environmental pollution. The composition and dimensions of prepared silica dioxide, which were determined by modern analytical methods such as SEM, XRD and IR, showed that the purity of SiO<sub>2</sub> was more than 90% and grain dimensions were about nanometers. In this study, the rice residues derived SiO<sub>2</sub> was used as a 5% (w/w) blend for polyurethane and low pressure polyethylene. The choice of polyethylene for composites fabrication was based on its relatively plain structure and good technological properties. The polyurethane has choose as a polymer with good resistance to abrasive wear, high elasticity, and high resistance to weathering. Evaluation of the physic mechanical properties of composites showed that the strength of polyethylene based composite samples blended with 1% (w/w) silica dioxide increased up to 33%, in the case of polyurethane composites blended with 0.5% (w/w) silica dioxide the strength increased up to 21%. In comparison with same composites blended with classical aerosil in the equivalent dosage, the strength of polyethylene based composites was higher than about 9%, in the case of polyurethane based composites it was higher than about 16%. Considering the saving of natural resources and ecological expediency, the replacing of synthetic silica dioxide by rice residues derived silica dioxide of is of considerable interest.

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