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NEW APPROACH STUDY FOR THE EVALUATION OF EPDM RUBBER WASTE**Melisa Temiz**

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Abstract

Ethylene propylene diene monomer rubber (EPDM) finds applications in several industrial branches due to its properties. EPDM (ethylene propylene diene monomer) is an important synthetic rubber and is used in many different sectors. In parallel with the increase in the amount of use, EPDM waste occurs. EPDM wastes are not likely to be remelted and reprocessed due to their cross-linking and are a significant loss for the plastics industry and are often consumed as fuel. Another method of evaluating EPDM residues is to reduce them to small sizes and use them as fillers in different polymers. In this study, new epoxy composites were created using EPDM waste filler. EPDM waste was used in bisphenol-A type epoxy resin at a ratio of 5-10-15-20-30 wt%, either alone or as a hybrid filler with nano-carbon black (CB). The EPDM:CB ratio was selected as 1:1, 1:3, and 3:1 by weight. The composites were prepared according to ASTM D 638 standards using the casting technique. Composites' morphology was characterized by Scanning Electron Microscopy (SEM). Effect of EPDM:CB ratio, filler amount, water sorption, and low temperature on the mechanical properties of the composites were investigated. In order to determine the effect of water sorption and low temperature, the samples were tested for 3-21 days. A decrease was observed also in the mechanical properties (tensile strength, e-modulus, and hardness) of 30 wt% filler composites formed with both EPDM and hybrid filler, considering the effect of low temperature (freezing) and water sorption. Moreover, the mechanical properties of composites decreased as the test time increased.

Keywords: epoxy resin, EPDM, composite