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Studies on the synthesis of silica powder from rice husk ash as reinforcement filler in rubber tire tread part: Replacement of commercial precipitated silica**Addis Lemessa Jembere and Solomon Workneh Fanta**
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The ultimate objective of this experimental analysis is to prospect the possibility of replacing inorganic filler (which consumes exhaustive energy) by organic filler. In this study investigation on the utilization of Rice Husk Ash Silica (RHAS) as filler in vehicle tire tread part was examined. Silica was synthesized from rice husk ash by using a method based on alkaline extraction followed by acid precipitation. Effects of extraction temperature, retention time and NaOH concentration as a digesting agent were investigated to get the best possible silica yield. The maximum yield was noted at the interaction of 60°C, 1.5 hours and 2.5 molarities with the silica purity of 83.7% by weight. The maximum silica yield obtained was further subjected to different characterization techniques by means of AAS, XRD, BET, FTIR and DSC. Rheological and mechanical testing was performed on the formulated (12 PHR) compounded rubber vulcanizates filled with RHAS and COS (Commercial Silica) independently. The curing characteristic is that at 175°C on RHAS and COS filled rubber was examined with an oscillating disk Rheometer. It was eminent that the rubber composite products reinforced with RHAS had shorter scorch time (T'₁₀) at 1.20 minutes which caused a premature vulcanization than the COS filled rubber composite, improving the time required to start the vulcanization. Though, the optimum curing time (T'₉₀) showed retardation due to the possible interaction of silica with the accelerators making it unavailable for cure reaction. The maximum torque for the RHAS was 13.49 d.Nm. Overall mechanical properties like hardness, Young's modulus, abrasion resistance of rubber products reinforced with RHAS was better than COS filled rubber composite.

Biography

Addis Lemessa Jembere has completed his Master of Science degree in Process Engineering from Bahir Dar Institute of Technology, Bahir Dar University in Ethiopia. Presently, he is the Lecturer of Bahir Dar University in the Department of Chemical Engineering.

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