GROUND PADDY HUSK ASH AS A FILLER FOR RUBBER COMPOUND

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Abstract

The conversion of paddy husk an agricultural waste product at the farm level into thermal energy has become a subject of growing interest, particularly in developing country like Sri Lanka. The process generates thermal energy by burning the organic matter in the husk and giving substantial quantities of residual ash which is essentially silica. Depending on the conditions of burning silica in the ash can exist either in the amorphous or in crystalline form. Silica in amorphous form is known to rubber technologists as a reinforcing filler ,material. It was thought that this ash may be used as a reinforcing filler. Investigations were therefore carried out with the ash generated as a 'by-product from the husk fired furnace developed by Mr. H.I. Fernando for the curing of tobacco leaves. The dynamic burning of paddy husk in this gas ifieation process generated white ash. X-ray diffraction studies has revealed that the silica in the white ash is in active amorphous from The present project is aimed at determining the suitability of this ash of paddy husk as a 'reinforcing filler material for rubber .Visual examination of the ash indicated that a reduction of the particle size may be necessary. Therefore the ash was ball milled for 8 hrs. Particle size determination has shown that 8 hrs: grinding is inadequate and a longer period of grinding with a dispersing agent is necessary to obtain a reinforcing filler from paddy husk ash.(PHA). Time was not adequate to do this. This ash ground for 8 hrs. was incorporated into natural rubber compounds to test its suitability as a reinforcing filler. Vulcanizate of this compound was compared with vulcanizates containing HAF, precipitated silica and industrial kaolin. The results of physical testing showed that vulcanizate containing PHA as a filler had a better resilience than vulcanizates containing precipitated silica and HAF Black. Modulus at 300% alongation was found to be superio~ to that given by vulcanizate containing industrial kaolin, and comparable to that given by vulcanizate loaded with pracipi+ated silica. Tensile strength and abrasion resistance are poor. This may be due to the la~ge particle size as revealed by the particle size analysis and hence a longer wet ball milling time is necessary.