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## Effect of electron beam irradiation on (waste tire dust)-filled ethylene vinyl acetate in the presence of bisphenol a diglycidyl ether (Article)

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## Abstract

The effect of bisphenol A diglycidyl ether (BADGE) and electron beam (EB) irradiation on the properties of waste tire dust (WTD) - filled ethylene vinyl acetate (EVA) has been studied. The EVA/WTD ratio was fixed to 80:20, whereas the BADGE concentration varied from 1 to 5 wt%. The samples were then irradiated using a 3.0-MeV EB machine at 50 kGy to 200 kGy at increments of 50 kGy. All the samples were subjected to various mechanical, physical, and thermal tests. Prior to irradiation, the mechanical properties of the composites show a gradual decrease with increasing BADGE concentration. Such observation is attributed to the plasticizing effect of the BADGE, as indicated by the reduction in mixing torque and a 14% increase in the elongation at break with the addition of 5 wt% BADGE. Results of gel fraction indicated that BADGE did not accelerate the irradiation-induced crosslinking of EVA/WTD composites. The scanning electron micrographs and tan  $\delta$  curves of EVA/WTD composites showed evidence that the addition of BADGE and EB irradiation of the EVA/WTD improves the compatibility of the composite. The overall results revealed that the irradiated EVA/WTD composite without BADGE gives a better enhancement in mechanical properties compared with the composites incorporated with the BADGE. J. VINYL ADDIT. TECHNOL., 23:172–180, 2017. © 2015 Society of Plastics Engineers. © 2015 Society of Plastics Engineers

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