MMT Reinforced EVA Nanocomposite Foams Using Supercritical Fluid Carbon Dioxide

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Montmorillonite (MMT) reinforced poly (ethylene-co-vinyl acetate) (EVA) nanocomposite foams with low density (0.26-0.32 g/cm3) were developed using supercritical CO2 technique in the mixing and foaming process. MMT nanoparticles were well dispersed and completely exfoliated in the EVA matrix up to 5 wt% of MMT content. EVA/MMT nanocomposite foams showed a smaller cell size with more uniform cell structure than pristine EVA foam. The density of nanocomposite foams was smaller than pristine EVA foam and the foaming ratio of nanocomposite foams was larger than EVA foam because of the nucleating effect of MMT nanoparticles. Furthermore, EVA/MMT nanocomposite foams exhibited a substantially higher compressive strength and modulus than pristine EVA foam. The specific modulus of EVA/MMT 5 wt% nanocomposite foam was greatly increased by 360 % compared to pristine EVA foam. Overall, EVA/MMT nanocomposite foams had fine cell structure and improved mechanical properties with more light weight than pristine EVA foam.