

Effect of vinyl acetate content on the photovoltaic-encapsulation performance of ethylene vinyl acetate under accelerated ultra-violet aging

Abstract:

The vinyl acetate (VA) content in ethylene vinyl acetate (EVA) can significantly affect its performance as an encapsulant in photovoltaic modules under field conditions. EVA films of varying VA content (18, 24, 33, and 40%) have been prepared using twin screw extruder with the necessary additives and subsequently cured at 150 °C. All the EVA films have been subjected to UV radiation at a wavelength of 340 nm for 1000 and 2000 h to simulate accelerated field aging. The effects of accelerated aging on the gel content, mechanical properties, transmittance, Fourier transform infra-red (FTIR) spectra, thermal stability, degree of crystallinity, and yellowness have been studied. The observations made in this study of UV aging up to 2000 h suggests that the optimum range of VA content in EVA should be between 18 and 33% by weight. VA content beyond 40% degrades almost all properties needed for an encapsulate material after aging of only 2000 h. VA content of around 18% is the most stable under UV aging conditions but has a slightly lower value of transmittance for the unaged sample although the difference in transmittance between different specimens decreases with UV aging.

Access the research paper here:

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