

Photo-Thermal Degradation Analysis of Single Junction Amorphous Silicon Solar Module Eva Encapsulation

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Abstract : Ethylene vinyl acetate (EVA) encapsulation degradation affects the performance of photovoltaic (PV) module. Hotspot formation causes the EVA encapsulation to undergo photothermal deterioration and molecular breakdown by UV radiation. This leads to diffusion of chemical particles into other layers. During outdoor deployment, the EVA encapsulation in the affect region loses its adhesive strength, when this happen the affected region layer undergoes rapid delamination. The presence of photo-thermal degradation is detrimental to PV modules as it causes both optical and thermal degradation. Also, it enables the encapsulant to be more susceptible to chemicals substance and moisture. Our findings show a high concentration of Sodium, Phosphorus and Aluminium which originate from the glass substrate, cell emitter and back contact respectively.

Keywords : ethylene vinyl acetate (EVA), encapsulation, photo-thermal degradation, thermogravimetric analysis (TGA), scanning probe microscope (SPM)

Conference Title : ICSREE 2016 : International Conference on Sustainable and Renewable Energy Engineering

Conference Location : Montreal, Canada

Conference Dates : May 16-17, 2016