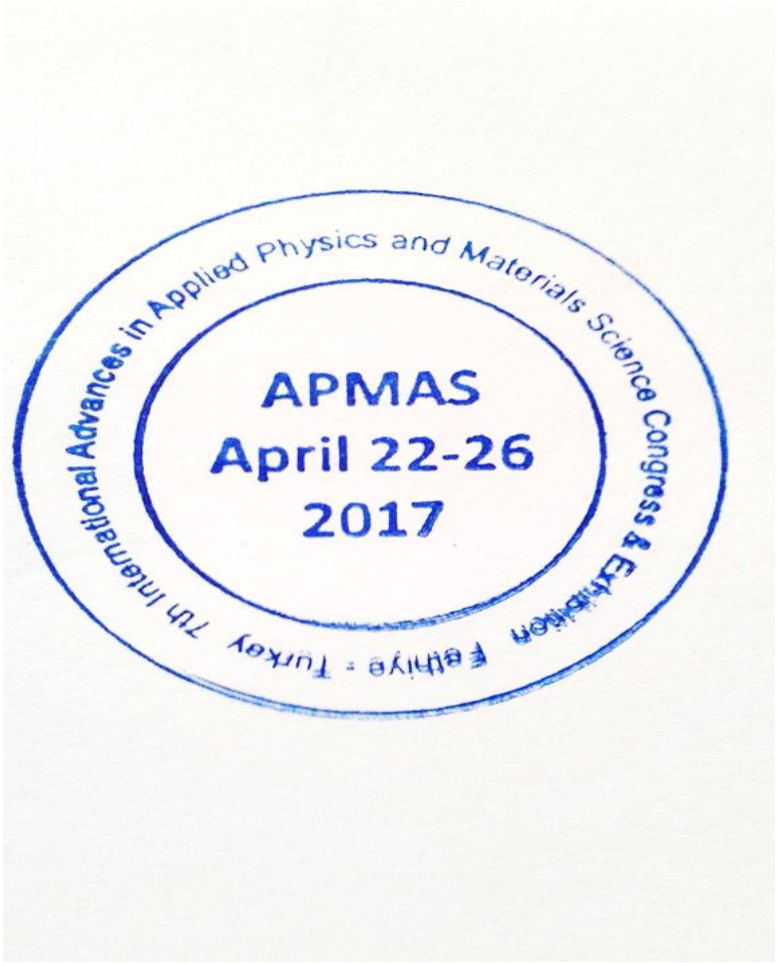
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APMAS 2017



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The Effect of Natural Weathering on the Morphological and Thermal Properties of Polyetherimide (PEI) Composites

T. SAHIN*, S. SAHIN, T. YILMAZ

Kocaeli University, Machine Engineering Department, İzmit, Turkey

E-mail: tulsah@kocaeli.com.tr

Abstract:

In service, failures of glass–fiber-reinforced polymeric composites are commonly attributed to aging of the material in its particular environment, brought about by a combination of the effects of heat, water, and mechanical stresses on the material. Several studies have shown the important effects of absorbed water and aging temperature on the physical and mechanical properties of composite materials. The natural weathering behavior on thermal properties of polyetherimide (PEI) laminates have been investigated. The laminates were exposed natural weathering at five months in Kocaeli/Turkey. The thermal properties of natural weathering materials were examined by differential scanning calorimetry (DSC) and thermomechanical analysis (TMA) tests. In addition, the degradation of the natural weathering material was displayed with scanning electron microscope (SEM). The effect created by natural weathering due to weak glass/carbon–fiber/PEI matrix adhesion is a fiber/matrix interface intensive formation. During 5 months weathering, the softening temperature and the expansion coefficient decreased. Decreased in softening temperature values of samples exposed to natural weathering is likely to be based on plasticization which increases polymer chain mobility in amorphous region.

Keywords: Polyetherimide, Thermomechanical analysis, Natural weathering.

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