



EFFECTS OF AGING IN CARBON FIBER REINFORCED POLYMER COMPOSITES EXPOSED TO NATURAL ENVIRONMENT

Larissa R. Pinheiro de Brito (1), Ana P. Cysne Barbosa (1), José Daniel D. Melo (1), A. do Nascimento (1), Rubens M. do Nascimento (1)

(1) Department of Materials Engineering, Federal University of Rio Grande do Norte, Av. Senador Salgado Filho 3000, CEP:59078970, Natal, RN, Brazil.

Abstract: Carbon fiber reinforced polymer composites are most used in aeronautic and aerospace structures, which are often exposed to ultraviolet (UV) radiation, temperature cycles and humidity. These environmental conditions are known to accelerate the degradation processes of the polymer, which can ultimately lead to failure of the component. The aim of this work is to study the effects of aging on the damage mechanisms of carbon-epoxy composites exposed to environmental conditions, which include temperatures up to 40°C, high humidity levels and UV light for a total exposure period of 1,440 h. Composites were characterized using Fourier Transform Infrared Spectroscopy (FTIR), Scanning Electron Microscopy (SEM), Dynamic Mechanical Analysis (DMA), weight changes as also dimensional changes before and after exposure. The effects of aging were evidenced by chemical changes, weight loss and fiber exposure, as well as alterations in glass transition temperature of the material.

Keywords: carbon-epoxy composites, aerospace, aging, environmental conditions