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Effect of Thermal Shock Cycling on the Tensile Behavior of Phenolic based Composites Reinforced with Basalt and Carbon Fibers

R. Eslami Farsani; S.M.R. Khalili and M. Najafi

ABSTRACT

The aim of the present work is to investigate the effect of thermal shock cycling on the tensile behavior of two types polymer-matrix composites (phenolic resin, reinforced with woven basalt and carbon fibers at a total volume fraction of approximately 35%) in oxidative atmospheres (air). During the thermal shock cycling test performed in air, there is a coupling effect between matrix oxidation, occurring at the high temperatures of the cycle, and matrix cracking due to thermo-mechanical ply stresses induced by the differences in the thermal expansion coefficients between the reinforcement and the matrix phase. The tensile properties of composites reinforced with woven basalt fibers were not significantly affected by thermal shock cycles. The reduction of tensile strength and elastic modulus after thermal cycling was less than 5% and 8% of initial values for composites reinforced with basalt fibers and more than 11% and 18.5% for composites reinforced with carbon fibers, respectively.

KEYWORDS : Thermal shock cycling, Phenolic resin, Carbon fibers, Basalt fibers

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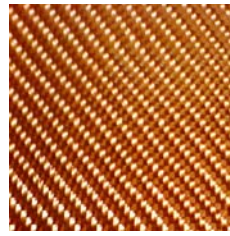
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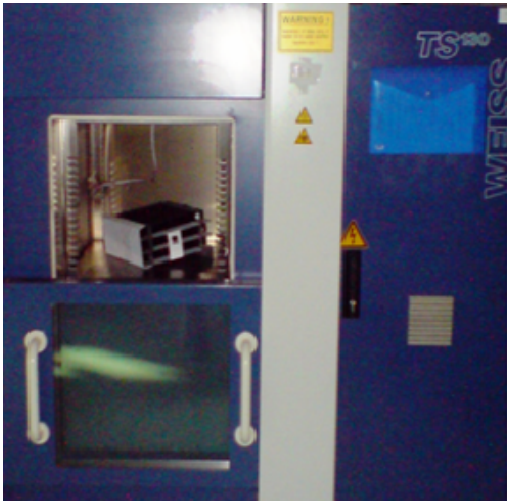
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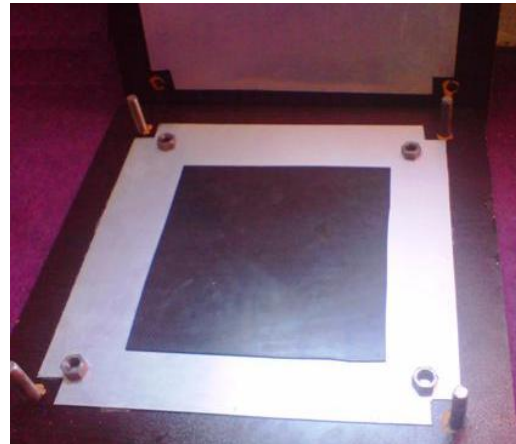
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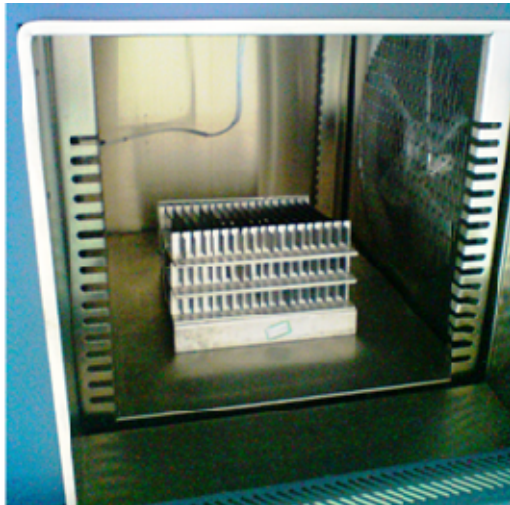
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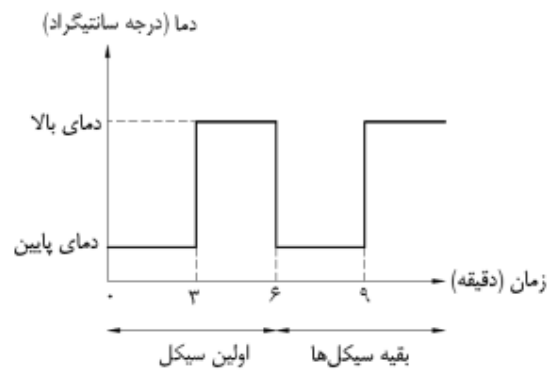


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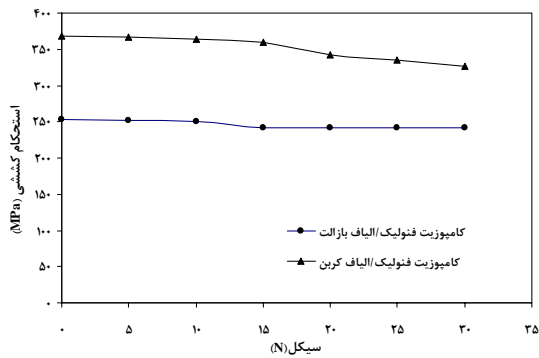
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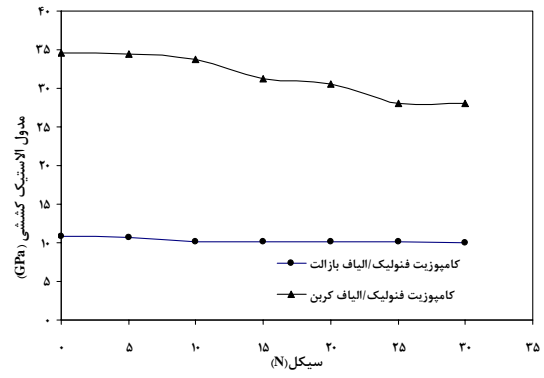
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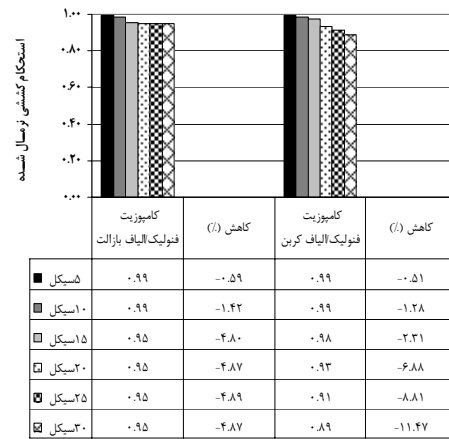
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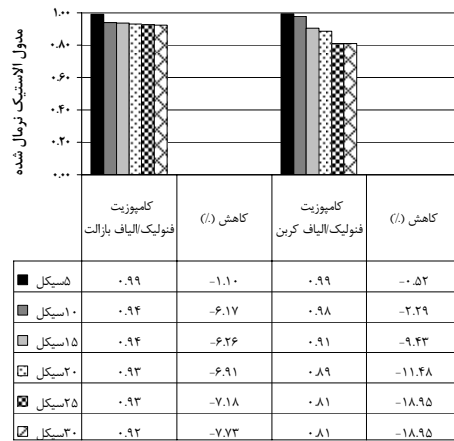
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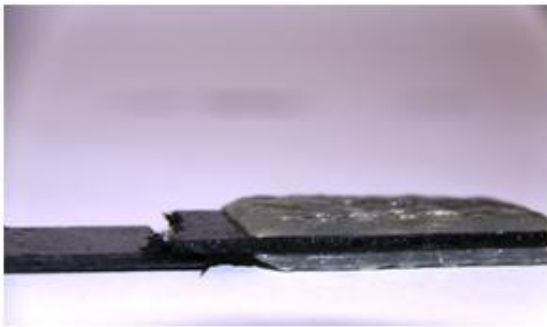
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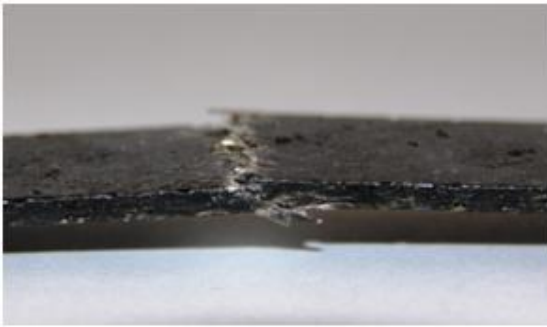
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