MONITORING CARBON/BMI COMPOSITE LAMINATES USING EMBEDDED FIBER OPTIC SENSORS

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ABSTRACT
Bismaleimide (BMI) composites are used in applications that require good mechanical properties at high temperatures. In this paper, a non-destructive inspection technique for BMI composites which can be used at high temperatures is presented. cavity based External Fabry-Perot Interferometer (EFPI) optical sensors have been developed and embedded in the laminates. These sensors are capable of operating in temperatures up to 800°C. The embedded sensors are used to perform real time cure monitoring of a BMI composite. The composite is cured using an out-of-autoclave (OOA) process. Once the composite is cured, the same sensors are used to measure mechanical performance of the laminate. The performance of the embedded sensor is investigated under tensile loading at room temperature. The embedded fiber optic sensors were found to be capable of performing in-situ cure monitoring and structural health monitoring of BMI composite laminates.