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Thermal oxidation and degradation of benzoxazine-epoxy system

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Thermal oxidation of the benzoxazine-epoxy resin system differing mixture compositions was studied. The cured specimens were aged at 180°C and 200°C in air circulating oven for various durations. The changes in the thickness of oxidized layer, weight, and volume of oxidized specimens were recorded and the results were compared with similarly aged specimens made from epoxy/amine system with similar glass transition temperatures. Light microscopy was used to monitor the initiation of the oxidation-induced surface cracking and the crack number density. Dynamic Mechanical Analyzer (DMA) was used to monitor the glass transition temperature and dynamic modulus of specimens after thermal aging. Moreover, mechanical properties of the aged specimen including the tensile and flexural tests were performed to obtain the effects of thermal aging on the change in strength and stiffness of the aged specimens. These results showed that benzoxazine-based system showed a greater resistance to thermal oxidation as opposed to the epoxy system.

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