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MORPHOLOGY OF SELF-REPAIRED GNP/EPOXY COMPOSITES

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Epoxy resins with self-repairing properties have been studied. The different thermosetting systems studied are based on two different self-repairing mechanism. Both activate by heating. One of them is thermoset/thermoplastic blend formed by an epoxy matrix with a dispersed phase of a thermoplastic polymer with low melting point. The repairing process consists on the melting of thermoplastic polymer, which flows towards the crack, filling it. On the other hand, the other studied system is an epoxy resin formed by exchangeable disulfide crosslinks. The main advantage of this last material is that the repairing process is produced with the same thermosetting material.

The present work consists on analysing the efficiency and reproducibility of the self-repairing process, considering the recovery percentage and its quality. A deep study of the morphology of samples, before and after the repairing heating is carried out, to determine the efficiency of the process and, in addition, their reproducibility. The heating is induced by two different modes: the common external thermal source and self-heating induced by Joule's effect. This second mechanism is obtained adding graphitic nanofillers into the self-healing resin in percentage higher than their electrical percolation threshold. We have also studied the morphology of the epoxy resins doped with graphene nanoplatelets.

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