**Numerical Investigation into failure assessment of PMMA encapsulated self-healing composite microcapsules**

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**ABSTRACT:**

Microcapsules embedded autonomic healing materials have ability to repair microcracks when they come into contact with the crack by releasing the healing agent. Amount of healing agent supplied to the crack plane depends on the number of capsules broken. The microcapsules should have specified shape and thickness to release healing agent when subjected to loadings. Thus, it is important to know the load bearing capacity of the developed microcapsules and the stresses developed in the material. In the present study self-healing microcapsule is modelled and integrated with the polymer matrix composite. Aim the present study is to investigate failure criteria of PMMA encapsulated microcapsules by varying the shell thickness ,capsule diameter, weight percentage of capsules and loading condition at which the capsule is going to break. The strength of the capsule is evaluated by keeping the shell thickness as constant and varying the capsule diameter. It is observed from the results that the load required to break the capsules is increased with the increase in capsule diameter. Different loading conditions were applied on the capsules reinforced polymer matrix composite to find out when all the embedded capsules will break. Number of capsules broken is verified by comparing with the yield stress of capsule shell material and induced stress of the capsule.

***Key Words:*** *Microcapsules, Mechanical assessment, Numerical Investigation, self-healing composites*