

Shell-Enhanced Poly(Urea-Formaldehyde) Microcapsules With PDMS/Pt Healing Materials for Self-Healing Process

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This study reveals the poly (urea-formaldehyde) microcapsules containing poly (dimethyl siloxane) (PDMS) or Platinum (Pt) catalyst for self-healing process. Self-healing microcapsules embedded materials possess excellent healing efficiency in response to damage in host material. When the physical damage is given to host material and microcapsules are broken, PDMS and Pt catalyst can meet and Pt-catalyzed hydrosilylation of PDMS proceed, so the self-healing process starts. In this study, microcapsules were prepared by in-situ polymerization via an oil-in-water (O/W) emulsion. The mechanical and heat stability of microcapsules could more strengthen by combining size control and sequential-addition of shell component simultaneously. Furthermore, these microcapsules were applied to polyurethane (PU) resin and their self-healing efficiency in response to damage was successfully determined.