

## Chitosan Promoted Toughened Polycaprolactone based Shape Memory Polyurethane Biocomposites

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We have demonstrated the fabrication of a polycaprolactone based toughened shape memory polyurethane biocomposite promoted by in situ incorporation of chitosan flakes. The chitosan were homogeneously dispersed in the polymer matrix in the form of flakes, as confirmed by the electron microscopic analysis and probably developed a crosslinked node that promoted toughness with more than 500% elongation at break. Mechanical analysis confirms the increment of ultimate tensile strength by approximately 130% in comparison to pristine polymer. X-ray analysis confirms the development of crystallites during tensile pull resulted from stress induce crystallization process which may retain the shape and melting of crystallites stimulate the shape recovery up to 100% even after permanent deformation. The polyurethane biocomposite also demonstrates relatively high thermal stability. Overall, the fabricated polyurethane biocomposite possesses a unique shape memory behavior, even after permanent deformation.