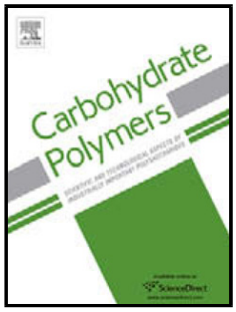

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Calcium silicate nanowires – An effective alternative for improving mechanical properties of chitosan-hydroxyethyl methacrylate (HEMA) copolymer nanocomposites

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- With increase in amount of nano-$CaSiO_3$, tensile strength & tensile modulus improved.
- More number of active sites of nanofiller caused modified mechanical properties.
- Hydrophilicity & biodegradation of chitosan remained unaffected due to nano-$CaSiO_3$.

Abstract

Nanowires of calcium silicate were successfully synthesized by ultrasonic irradiation process and incorporated into chitosan and hydroxyetheyl methacrylate (HEMA) copolymer matrix by solution blending for efficacious preparation of biodegradable nanocomposites. Remarkable improvement in mechanical properties of the nanocomposites was noticed after micro-tensile analysis. Enlarged surface area and higher aspect ratio of $CaSiO_3$ nanowires were the key factors responsible for such improvement. This was supported by EDS and XRD analysis in terms of proper distribution of nanofiller through the copolymer matrix and corresponding rise in percentage crystallanity respectively. Contact angle and biodegradation studies further clarified that nano-$CaSiO_3$ did not affect the hydrophilicity and general degradation route of chitosan copolymer respectively. This renders the nano-$CaSiO_3$ as an ideal substitute for preparing high performance nanocomposites to be applicable for biomedical applications.