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Barrier properties of nano silicon carbide designed chitosan nanocomposites

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Highlights

Title: Barrier properties of nano silicon carbide designed chitosan nanocomposites

- Thermal stability of chitosan/SiC nanocomposites is enhanced by three folds.
- SiC nanocomposites are high-quality resistance to chemicals.
- Substantial reduction in oxygen barrier properties.
- Tensile strength is improved by four times.

ABSTRACT

Nano silicon carbide (SiC) designed chitosan nanocomposites were prepared by solution technique. Fourier transform infrared spectroscopy (FTIR) and X-ray diffraction (XRD) were used for studying structural interaction of nano silicon carbide (SiC) with chitosan. The morphology of chitosan/SiC nanocomposites was investigated by field emission scanning electron microscope (FESEM), and high resolution transmission electron microscope (HRTEM). The thermal stability of chitosan was substantially increased due to incorporation of stable silicon carbide nanopowder. The oxygen permeability of chitosan/SiC nanocomposites was reduced by three folds as compared to the virgin chitosan. The chemical resistance properties of chitosan were enhanced due to the incorporation of nano SiC. The biodegradability was investigated using sludge water. The tensile strength of chitosan/SiC nanocomposites was increased with increasing percentage of SiC. The substantial reduction in oxygen barrier properties in combination

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