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Biopolymer based bionanocomposites

Chang-Sik Ha
Pusan National University, Korea

We have prepared several biopolymer based bionanocomposites for years. Those biopolymers include chitosan (CS), poly(lactic acid), or poly(hydroxyethylmethacrylate), etc., while partner polymers or inorganic fillers for bionanocompositres include clay, graphene oxide, carbon nanotube, and silver, etc. to prepare those bionanocomposites. A series of works on the bionanocomposites will be discussed in this talk, Here, one example is the CS contaiing bionanocomposites. CS is a biocompatible, biodegradable, and non-toxic natural polymer and has applications in wound healing, tissue repair, antimicrobial resistance, cell adhesion, and food delivery. In this presentation, we report the facile synthesis of hierarchical mesoporous bio-polymer/silica composite materials with bimodal mesopores using a dual-template of the cationic N,N,N-trimethyl chitosan (TMCs) and the anionic sodium dodecyl sulfate (SDS) via one-step synthetic strategy. The mesoporous bio-polymer/silica composites encapsulate a large number of guest drug molecules, Ibuprofen (IBU) or 5-fluorouracil (5-FU), due to their high surface area and pore volume. In addition, the mesoporous chitosan-silica composites also had a long term biocompatibility for the target release of the drug molecules to the CEM cells and MCF cells etc. as well as a pH sensitive controlled release behavior of the drug molecules. We also present functionalized graphene oxides (GO) with chitosan (FGOCs). FGOCs were found to significantly improve the solubility of the GO in aqueous acidic media. And more topics using other biopolymers will be dealt with in this talk.

Biography

Chang-Sik Ha has completed his PhD from Korea Advanced Institute of Science and Technology (KAIST), Seoul, Korea (1987). He has joined the Department of Polymer Science and Engineering, Pusan National University as a Professor in 1982. He is now a Director of the Pioneer Research Center for Nanogrid Materials. He has served as a Vice President of Pusan National University in 2012. He has served as an Editorial Board Member of several international journals including Associate Editor of the *Advanced Porous Materials* as well as an Associate Editor of the *Composite Interfaces*.

csha@pnu.edu

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