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Rajesh Sunasee

State University of New York at Plattsburgh, USA

Design of cellulose nanocrystals-based functional biomaterials for innovative applications

Research on cellulose nanocrystals (CNCs) continues to garner a high level of attention in both academia and industrial sectors due to their unique physicochemical properties. Their large surface area, excellent mechanical properties, biocompatibility, renewability, biodegradability and the presence of ample hydroxyl groups for surface chemical modifications have rendered them as attractive bionanomaterials for a number of innovative applications. CNCs can be easily derived via the acidic hydrolysis of native cellulose, the latter being the world most ubiquitous and abundant biopolymers. Depending on the source and extraction procedures, the resulting rod-like CNCs possess a nanoscale dimensions ranging from 50 to 3000nm in length with the cross-sections of 3-20nm. This talk will highlight the use of CNCs in various applications with the main focus on surface chemical modifications of CNCs. Surface chemical modifications of CNCs is an important process as it needs to be done in a such a way it does not affect the morphology and structural integrity of CNCs. Different fabrication strategies will be discussed for the design of CNC-based functional advanced biomaterials.

Biography

Rajesh Sunasee completed his PhD in Organic Chemistry in 2009 from the University of Alberta in Canada and was the recipient of an NSERC-IRDF Industrial Postdoctoral Scholarship at Omegachem Inc., Quebec, Canada. He is currently an Associate Professor of Chemistry at SUNY Plattsburgh. His research focuses on surface modifications of cellulose nanocrystals for potential biomedical applications and has published 20 peer-reviewed papers, 3 book chapters and 1 encyclopedia chapter. He was recently the recipient of SUNY Chancellor's Award for Excellence in Teaching. He continues to serve as an alternate councilor for the Northern New York American Chemical Society local chapter.

rajesh.sunasee@plattsburgh.edu

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