DESCRIPTION

Research into cellulose nanocrystals is currently in an exponential growth phase, with research into potential applications now strengthened by recent advances in nanomanufacturing. The possibility of routine commercial production of these advanced materials is now becoming a reality.

*Cellulose Nanocrystals: Properties, Production and Applications* provides an in-depth overview of the materials science, chemistry and physics of cellulose nanocrystals, and the technical development of advanced materials based on cellulose nanocrystals for industrial and medical applications. Topics covered include:

- A comprehensive treatment of the structure, morphology and synthesis of cellulose nanocrystals.
- The science and engineering of producing cellulose nanocrystals and the challenges involved in nanomanufacturing on a large industrial scale.
- Surface/interface modifications of cellulose nanocrystals for the development of novel biomaterials with attractive structural and functional properties.
- The scientific bases for developing cellulose-based nanomaterials with advanced functionalities for industrial/medical applications and consumer products.
- Discussions on the (i) reinforcing potential of cellulose nanocrystals in polymer nanocomposites, (ii) utilization of these nanocrystals as efficient templates for developing tunable photonic materials, as well as (iii) applications in sustainable electronics and biomedicine.
Cellulose Nanocrystals: Properties, Production and Applications will appeal to audiences in the physical, chemical and biological sciences as well as engineering disciplines. It will be of critical interest to industrialists seeking to develop sustainable new materials for the advanced industrial economies of the 21st century, ranging from adaptive “smart” packaging materials, to new chiral, mesoporous materials for optoelectronics and photonics, to high-performance nanocomposites for structural applications.

ABOUT THE AUTHOR

Wadood Hamad is Principal Scientist and Research Leader at FPInnovations, as well as Adjunct Professor at the University of British Columbia's Department of Chemistry. FPInnovations is one of the leading Research institutes exploring the industrial manufacturing and applications of cellulose nanocrystals (CNC), and has been a principal driver in the commercial viability of CNC. Dr Hamad's research team is currently focussed on to thematic areas: (i) CNC processing and characterization, and (ii) material synthesis and product development of advanced functional platforms based on CNC. Dr Hamad has been responsible for key developments around CNC synthesis and manufacturing, and holds over 20 patents for CNC applications in polymer nanocomposites, photonics, flexible electronics and optoelectronics, and over 100 peer-reviewed scientific publications appearing in Nature, Nature Communications, Advanced Materials, and elsewhere.

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