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SCHOOL OF BIO AND CHEMICAL ENGINEERING

DEPARTMENT OF CHEMICAL ENGINEERING

Nano cellulose from biomass and its application in polymer composite

Event Summary

Date 31/10/2020

TECHNICAL STAFF Er. D. GOKUL HONARARY SECRETARY IICHE CRC SCIENTIST, IBRO Dr. S. SATHISH HEAD OF THE DEPARTMENT Dr. D. PRABU ORGANISING SECRETARY Dr. A. ANNAM RENITA PROF. IICHE STUDENT CHAPTER COORDINATOR REGISTRATION Free Registration Link- https://forms.gle/6MKUCV9KaKF27GnM7 CONTACT : Mr.ABIMANYU (9942794269) (PRESIDENT IICHE SATHYABAMA STUDENT CHAPTER -CRC) Mr.AKASH (8667592255) (VICE-PRESIDENT IICHE SATHYABAMA STUDENT CHAPTER -CRC)	 SATHYABAMA INSTITUTE OF SCIENCE AND TECHNOLOGY (DEEMED TO BE UNIVERSITY) SCHOOL OF BIO AND CHEMICAL ENGINEERING DEPARTMENT OF CHEMICAL ENGINEERING AND  INDIAN INSTITUTE OF CHEMICAL ENGINEERS CHENNAI REGIONAL CENTRE Cordially invites you TO The Webinar-2020  Dr. KHAIRATUN NAJWA BINTI MOHD AMIN SENIOR LECTURER UNIVERSITI MAYAYSIA PAHANG, MALAYSIA E-CERTIFICATE WILL BE PROVIDED	NANO CELLULOSE FROM BIO- MASS AND ITS APPLICATION IN POLYMER COMPOSITES 31-10-2020 (10.30 - 11.30) CHIEF PATRONS Dr. MARIAZEENA JOHNSON CHANCELLOR Dr. MARIE JOHNSON PRESIDENT CONVENER Dr. WILSON ARUNI PRO-VICE CHANCELLOR ADVISORS Dr. T.SASIPRABA VICE CHANCELLOR Dr. S.S.RAO REGISTRAR
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The demand for exploring eco-friendly and advanced materials for sustainable development with exceptional physicochemical properties is increasing day by day. Recently, nanocellulose in its all form such as cellulose nanocrystal, cellulose nanofibers, and bacterial cellulose gain great attention in both research and industrial areas due to their appealing inherent properties such as excellent mechanical properties, high concentration of hydroxyl groups for modification, high surface area, lightweight, and biodegradability. However, the hydrophilic nature of nanocellulose restricted its utilization in various applications, but the presence of a functional

group on its surface provides a platform for surface modification through various techniques. Because nanocellulose has a high elastic modulus, rigidity and a low thermal expansion coefficient, it is an excellent material for polymer reinforcement. Nanocellulose has high crystallinity. The cellulose molecules are arranged in a regular line and the intra- and intermolecular hydrogen bonds make cellulose a relatively stable polymer and impart the cellulose fibers with high axial stiffness and strength to cellulose fibers. The tensile strength of nanocellulose is much higher than that of steel wire and general carbon fiber, reaching 7.5–7.7 GPa, while the density (1.6 g/cm^3) is only one-fifth of that of steel. Moreover, nanocellulose has a high specific surface area with a large number of exposed hydroxyl groups, which is beneficial for the grafting or crosslinking of other substances to obtain different surface properties for surface functionalization. Chemical modification of the surfaces of nanocellulose increases its dispersibility of nanocelluloses within organic solvents or matrices. In addition, because of its high specific surface area, the adsorption capacity of nanocellulose is high, which can be further enhanced by chemical modification. Because of these advantages, increasing attention was paid to the application of nanocellulose in composite materials. Its potential applications include engineering plastics, biodegradable plastics, biomedical materials, water purification material and electronic component materials.

The two directions for the development of nanocellulose reinforced polymer composites are functionalization and mass production, which essentially caters to the demand for better, stronger, cheaper and more variety in materials. In fact, many of the current challenges represent the development potential of this field. Regardless of theory, technology and application, any small breakthrough may propel the whole industry toward a major milestone. Nanocellulose reinforced polymer composites are playing an increasingly important role in the following applications: engineering plastics, functional films, bioscaffolds, catalysts, drug carriers, adsorption materials and flexible electronic components, with more potential applications under investigation. Thus, with further research, nanocellulose reinforced polymer composites are expected to become the most valuable composite material in the coming era.