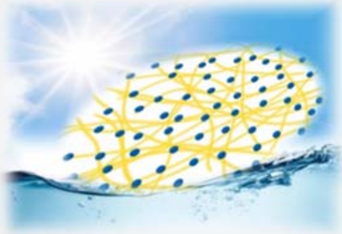
Webinar on

Nanocellulose production and applications

November, 30 and December 1 and 2, 2021



Project COOPB20418 *Development of nanocellulose-based nanocomposite materials as support of solar photocatalysts*, i-COOP+ Programme 2019 CSIC

This second cycle of webinars will consist of three online seminars aimed at giving an overview of the uses of nanocellulose as an eco-friendly material for multiple applications, focusing on the methodologies required for nanocellulose production, the different sources of nanocellulose, as well as its increasing use in a wide range of applications:

Nov 30, 2021
15:00 CET
11:00 BRT

Raquel Martín Sampedro, INIA-CSIC (Spain)

Production of nanocellulose from lignocellulosic biomass: From the plant to the nanoscale

Nanocellulose, including both cellulose nanofibers and cellulose nanocrystals, is a promising biomaterial useful in a wide range of applications including cosmetics, drug delivery systems, nanocomposites, gas-barrier films, food-packaging, microelectronics, photonics and other high-tech materials. Some of the appealing properties of nanocellulose are its low density, high strength, high optical transparency, large surface area, non-toxicity, and versatile surface chemistry. Another important advantage is that it can be obtained from renewable resources such as forest and agricultural lignocellulosic biomass. To accomplish this, the fibers in the lignocellulosic material should be extracted and broken down into building blocks resulting in nanofibers or nanocrystals depending on the followed procedure. The shape, size, composition and surface chemistry of the resulting nanocellulose depends not only on all the treatments performed from the harvest of the biomass to achieve the nanoscale, but also on the composition and properties of the starting lignocellulosic material. Therefore, nanocellulose with tunable final properties can be produced by choosing the production methods and the lignocellulosic raw material.

Dec 1, 2021
17:00 CET
13:00 BRT

Hernane da Silva Barud, Universidade de Araraquara, Araraquara-SP, (Brazil)

Bacterial nanocellulose as material for pharmaceutical and biomedical applications

In the last decade, bacterial nanocellulose (BNC) has received considerable attention aiming multifunctional materials and applications (e.g. medical, pharmaceutical, foods, photonic). The unique properties of BNC, such as mechanical stability, tensile strength, thermostability, crystallinity, purity and biocompatibility make it a promising candidate for commercial applications in different areas. This talk provides an overview of BNC structure, biosynthesis and main applications in biomedical (scaffolds for tissue engineering, cell culture platform, bolus devices) and pharmaceutical (drug delivery, micro and nanoparticles). The most significant contributions of Biopolymer and Biomaterial Research Group from Uniara - Brazil will be presented in this section.

Dec 2, 2021
17:00 CET
13:00 BRT

Sidney J.L. Ribeiro, Universidade Estadual Paulista (UNESP), Araraquara-SP, (Brazil)

Direction Modulated Photoluminescence in Nanocellulose Materials

Photonic materials featuring simultaneous iridescence and light emission are an attractive alternative for designing novel optical devices. The luminescence study of a new optical material that integrates light emission and iridescence through liquid crystal self-assembly of cellulose nanocrystal-template silica approach is presented here. Broad band (Rhodamine 6G) [1] and narrow band (Eu^{3+} and Tb^{3+} compounds) [2] have been considered and freestanding composite films with a chiral nematic organization are obtained. Cellulose nanocrystal film structure comprises multi-domain Bragg reflectors and the optical properties of these films can be tuned through changes in the relative content of silica/cellulose nanocrystals. Overall, such findings demonstrated that the photonic structure plays the role of direction-dependent inner-filter, causing selective suppression of the light emitted with angle-dependent detection.

[1]- M.V. Santos et al, Frontiers in Bioengineering and Biotechnology, 9, 617328, 2021
[2]- M.V. Santos et al, Proc. of the 2019 SBFoton International Optics and Photonics Conference (SBFoton IOPC) (São Paulo IEEE) http://dx.doi.org/10.1109/SBFoton-IOPC.2019.8910176.

Free registration: https://forms.gle/GnT9g59TWpQ3epDh6