

FUNCTIONALIZED NANOCELLULOSES: NEW APPLICATIONS OF AN OLD&NEW BIOPOLYMER

Dr. Alessandra Operamolla
Assistant Professor, Università
degli Studi di Bari Aldo Moro (Italy)

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Natural materials represent an unlimited source of inspiration for the design of innovative and smart architectures. Cellulose is the most abundant organic polymer on Earth, cheap, accessible, sustainable and biodegradable. It self-assembles into crystalline structures which can be isolated from plants to open unexpected opportunities for this old&new biopolymer.

Cellulose crystalline fibers, featuring high aspect ratio with a diameter ranging from 5 to 50 nm and length between 100 and 500 nm, are named cellulose nanocrystals (CNCs). These emerging nanomaterials display intriguing properties and have deserved great attention in last years for their potentialities in several fields of application, including manufacturing of nanocomposites and hydrogels, drug delivery, biocatalysts immobilization, biosensing and optoelectronics. A wide variety of functionalities can be anchored on their surface, controlling the assembling process of the final nanostructures. Hence, CNCs are ideal building blocks for smart architectures where environmentally friendly and multifunctional substrates are desired.

In this presentation, new concepts of nanocelluloses application will be presented: preparation and topochemical functionalization of transparent cellulose nanopaper thin films for electronics, preparation of self-assembled nanostructures composed of negatively charged CNCs and cationic entities and application of CNCs in Cultural Heritage.



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Instituto de Ciencia
de Materiales de Aragón

/ Facultad de Ciencias, Universidad de Zaragoza - CSIC /
C/ Pedro Cerbuna 12. 50009 Zaragoza. Spain

