



2nd Conference on Green Chemistry and Sustainable Coatings

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Nanolignin

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Introduction

Challenges related to lignin valorization are due to two main issues. The first is the extreme variability and diversity of lignins from different botanical origins and productive streams. This makes lignin exploitation extremely challenging and difficult to scale. The second problem still unsolved is the control of lignin multifunctionality.

To date huge efforts have been focused on these two challenges trying to develop innovative isolation and fractionation processes and selective lignin modification routes. However only a few of these have been translated into existing industrial processes.

Results and Discussion

An alternative approach to lignin valorization lies however in the acceptance of lignin variability and multifunctionality and in the exploitation of its chemical physical properties as a whole. Lignin displays amphiphilic structure due to the presence of polar protic phenolic and alcoholic groups and apolar aromatic rings. The presence of phenolic moieties induces chelating, complexing and stacking properties. These characteristics, associated with significant antioxidant, UV absorbance and antimicrobial properties make lignin an ideal candidate for the development of innovative materials.

The exploitation of the propensity of lignin to aggregate is a key step in the development of lignin based nanomaterials. One very promising application of lignins is their use in the generation of nanoparticles, nanocapsules and nanofibers for biomedical and agricultural applications. In light of potential applications, synthesis optimization, detailed morphological characterization, determination of stability profiles and stimuli responsive behavior of lignin nanocapsules, nanoparticles and nanofibers has been investigated.

Biography

Claudia Crestini graduated in 1996 with a PhD on lignocellulosic materials valorization at the University of Tuscia, Viterbo, Italy. From 1995 to 1997 she was visiting scientist at McGill University in Montreal, Canada. She has been researcher and associate professor at the Tor Vergata University since 1998 and, since 2018, is full professor in Chemistry at the Department of Molecular Sciences and Nanosystems, Ca' Foscari University of Venice, Italy.



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Author of over 170 publications, 18 patents and over 140 oral presentations at international conferences, she has h-index 57 and 9898 citations. She is Editor of Journal of Chemistry, Cellulose Chemistry & Technology and Molecules.

She has been nominated and elected Fellow of the Royal Society of Chemistry (RSC) and the International Academy of Wood Science (IAWS)

From 2021 she is Member of the commission for the National Scientific Habilitation (abilitazione scientifica nazionale ASN settore 03/b1-fondamenti delle scienze chimiche e sistemi inorganici)

From 2019 she is Member of the Scientific Committee of Center for Sustainability, Ca' Foscari University

From 2019 she is Chair of the teaching Committee of the graduate course in Sustainable Chemistry and Technologies of the University Ca' Foscari of Venice

Professor Crestini's scientific activities focus on the field of lignin and natural polyphenolics valorization: nanoparticles, nanocapsules, nanofibers and their derived materials, structural characterization, catalysis, biomimetic catalysis and biotechnology in lignin oxidative modifications. She founded the Polyphenols Chemistry & material Science laboratory at the Department of Molecular Science and Nanosystems at Ca' Foscari University. This is one of the few Italian Laboratories with significant R&D activities in the field of sustainable chemistry and materials with a specific focus in lignin biorefinery, development of new hybrid materials and nanomaterials from renewable biopolymers. She independently developed specific research areas of fundamental importance in the sector. Over the years she has been focused - also in collaboration with multinational companies- on sustainable development and circular valorisation of renewable materials.

Claudia Crestini will chair the 21st International Symposium on Wood Fiber and Pulping Chemistry 21st ISWFPC 4-7 July 2023 in Venice