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Seminari&Corsi

PhD Course



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Materials

FROM WATER REMEDIATION TO CONTROLLED DRUG- RELEASE: SYNTHESIS AND APPLICATION OF POLYSACCHARIDE-BASED NANOSTRUCTURED MATERIALS

June 6, 2018

10:00-11:00

Aula B1.1

Polysaccharides are versatile building blocks derived from natural and renewable sources. The selective oxidation of hydroxyl groups present on the polysaccharide backbone favors the introduction of functional moieties for further processing. When applied to **cotton or wood cellulose**, the oxidation step promotes the partial conversion of alcoholic functions to carboxylic groups also leading to the **formation of cellulose nanofibers (CNF)**. The freeze drying process in the presence of suitable cross-linkers favors the re-combination of CNF in macro-sized nanostructured porous aerogels, whose performances have been exploited in terms of adsorption and release activity. When a similar approach is applied to galactomannans, **the resulting aerogel shows superb water absorption capability** .

The new CNF-based aerogels, developed following an eco-design approach, were **successfully tested as potential sorbent units for water remediation from heavy metals and organic contaminants** . Moreover, after selective functionalization, the system can be easily modified, in order to introduce additional chemical properties, such as sensing for specific targets, or to enforce the mechanical and structural performances.

These polysaccharide-based aerogels have been also investigated in terms of **drug-delivery efficiency**. Finally, they can also operate as **suitable organic templates for further organic and inorganic coating** , in order to differentiate the properties of the resulting structures (hydrophobicity, antioxidant or photocatalytic activity).

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