

RECENT ADVANCES ON THE SURFACE FUNCTIONALISATION OF LIGNOCELLULOSICS: FUNDAMENTALS, TECHNIQUES OF CHARACTERISATION AND CONCRETE APPLICATIONS

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The present lecture is focused on the recent advances on surface chemical modification of lignocellulosics. It will be divided into four parts:

1. The first part will be devoted to the basic consideration on surface phenomena with a special care about the difficulties associated with surface contamination, the surface energy characterization, the surface properties determinations, etc.

2. The second part will be focused on the relevant characterization techniques, including classical low-resolution ones and more efficient tools such as: X-ray photoelectron (XPS) and more recently Time of Flight Secondary Ion Mass Spectrometry (ToF SIMS). This presentation assesses the merits and the drawbacks of these techniques [1, 2].

3. The third part points out the interest in using polysaccharides (cellulose mainly starch) in several functional materials. These two raw materials could be subjected to several surface modification strategies, namely (i) physical treatments (ii) chemical grafting by direct condensation, “grafting from” and “grafting onto” approaches. In this context, recent works investigating green solvent-based or solvent-less systems will be reported [1, 2].

4. All these treatments aim at providing these substrates specific functions, such as hydrophobic character, anti-microbial properties, etc. [1, 2]. Typical examples of achievements in this field will be given and discussed.

Finally, some relevant concluding remarks and perspectives will be given.

REFERENCES

[1] Rol F., M. N. Belgacem M. N., Gandini A., Bras J. Recent advances in surface-modified cellulose nanofibrils. *Progress in Polymer Science*, 88 (2019) 241–264

[2] A. Gandini, Belgacem M. N. The surface and in-depth modification of cellulose fibers. *Advances in Polymer Science*, 271 (2016) 169-206.

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