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SIMPOSIO INTERNACIONAL SOBRE MATERIALES LIGNOCELULOSICOS

CLICK CHEMISTRY FOR NANOCELLULOSE FUNCTIONALIZATION

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ABSTRACT

Over the recent years, robust, quick, and high fidelity chemical reactions tolerating both water and oxygen have been developed under the context of click chemistry. We employed the Cu^I-catalyzed azide-alkyne cycloaddition (CuAAC) reaction to produce chemically modified nanocellulose materials (cellulose nanocrystals and nanofibrillar cellulose). Surface activation (carboxylation and EDC/NHS assisted coupling chemistry) was used to yield robust nanocellulose-based matrices in which the desired functionality was installed via click chemistry reaction. Carboxylation was achieved either by TEMPO-mediated hypohalite oxidation or by utilizing the well-established affinity of carboxymethyl cellulose (CMC) onto native cellulosic fibres. Carboxylated cellulosic substrates were modified via amide linkages with amine-terminated molecules bearing alkyne- or azide-functionalities to create the precursors for the click reaction. Finally, we demonstrate the use of CuAAC reaction for the crosslinking and installation of specific chemical groups (BSA, PEG, fluorescent probe) onto the surface of nanocellulose substrates. Main results and possible applications for such systems will be discussed.