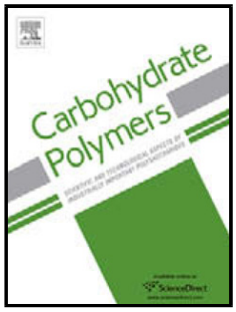

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Effect of TEMPO-Oxidization and Rapid Cooling on Thermo-Structural Properties of Nanocellulose

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Highlight :

- Cellulose nanofibrils (CNFs) were prepared from MCC using TEMPO-oxidation.
- Acid hydrolyzed nanocrystalline celluloses (NCCs) was treated with TEMPO-oxidation.
- Thermo-structural properties and thermogravimetric analysis of the nanocellulose were investigated with respect to rapid cooling treatment.
- Rapid cooling treatment improve thermo-structural properties of the nanocelluloses
- TEMPO-oxidation and rapid cooling treatment contributes to the fabrication of NCCs with a high number of carboxyl entities and admirable thermal stability.

Abstract

Recently, surface functionality and thermal property of the green nanomaterials have received wide attention in numerous applications. In this study, microcrystalline cellulose (MCC) was used to prepare the nanocrystalline celluloses (NCCs) using acid hydrolysis method. The NCCs was treated with TEMPO [(2,2,6,6-tetramethylpiperidin-1-yl)oxy radical]-oxidation to prepare TEMPO-oxidized NCCs. Cellulose nanofibrils (CNFs) also prepared from MCC using TEMPO-oxidation. The effects of rapid cooling and chemical treatments on the thermo-structural property studies of the prepared nanocelluloses were investigated through FTIR,