

Accepted Manuscript

Title: Bio-inspired hydrophobic modification of cellulose nanocrystals with castor oil

Authors: Qianqian Shang, Chengguo Liu, Yun Hu, Puyou Jia, Lihong Hu, Yonghong Zhou



PII: S0144-8617(18)30268-6
DOI: <https://doi.org/10.1016/j.carbpol.2018.03.012>
Reference: CARP 13362

To appear in:

Received date: 25-12-2017
Revised date: 3-3-2018
Accepted date: 8-3-2018

Please cite this article as: Shang, Qianqian., Liu, Chengguo., Hu, Yun., Jia, Puyou., Hu, Lihong., & Zhou, Yonghong., Bio-inspired hydrophobic modification of cellulose nanocrystals with castor oil. *Carbohydrate Polymers* <https://doi.org/10.1016/j.carbpol.2018.03.012>

This is a PDF file of an unedited manuscript that has been accepted for publication. As a service to our customers we are providing this early version of the manuscript. The manuscript will undergo copyediting, typesetting, and review of the resulting proof before it is published in its final form. Please note that during the production process errors may be discovered which could affect the content, and all legal disclaimers that apply to the journal pertain.

Bio-inspired hydrophobic modification of cellulose nanocrystals with castor oil

Qianqian Shang*, Chengguo Liu, Yun Hu, Puyou Jia, Lihong Hu, Yonghong Zhou*

Institute of Chemical Industry of Forest Products CAF, Nanjing 210042, Jiangsu Province, China

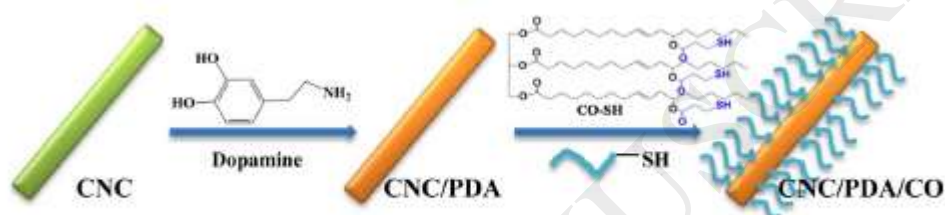
***Corresponding author:**

Tel (Fax): +86-02585482520

E-mail: shangqianqian@icifp.cn

yhzhou@icifp.cn

GRAPHICAL ABSTRACT

**Highlights**

- A co-friendly approach for hydrophobic modification of CNC is proposed.
- Thiol-containing castor oil was grafted onto CNC with the assist of dopamine.
- Morphology and crystalline structure of CNC were preserved after modification.
- Hydrophobicity of modified CNC was improved with contact angle up to 95.6°.

Abstract:

This work presents an efficient and environmentally friendly approach to generate hydrophobic cellulose nanocrystals (CNC) using thiol-containing castor oil (CO-SH) as a renewable hydrophobe with the assist of bio-inspired dopamine at room temperature. The modification process included the formation of the polydopamine (PDA) buffer layer on CNC surfaces and the Michael addition reaction between the catechol moieties of PDA coating and thiol groups of CO-SH. The morphology, crystalline structure, surface chemistry, thermal stability and hydrophobicity of the modified CNC were characterized by TEM, XRD, FT-IR, solid-state ^{13}C NMR, XPS, TGA and contact angle analysis. The modified CNC preserved cellulose crystallinity,

Download English Version:

<https://daneshyari.com/en/article/7782789>

Download Persian Version:

<https://daneshyari.com/article/7782789>

[Daneshyari.com](https://daneshyari.com)