

Article

Nano-Metal Organic Framework for Enhanced Mechanical, Flame Retardant and Ultraviolet-Blue Light Shielding Properties of Transparent Cellulose-Based Bioplastics

Lijian Sun, Limei Li, Xianhui An and Xueren Qian*

Key Laboratory of Bio-Based Material Science & Technology Ministry of Education, Northeast Forestry University, Harbin 150040, China; lantian0308@nefu.edu.cn (L.S.); limeili937@foxmail.com (L.L.); anxianh509@163.com (X.A.)

* Correspondence: qianxueren@nedu.edu.cn; Tel.: +86-13304642918

Citation: Sun, L.; Li, L.; An, X.; Qian, X. Nano-Metal Organic Framework for Enhanced Mechanical, Flame Retardant and Ultraviolet-Blue Light Shielding Properties of Transparent Cellulose-Based Bioplastics. *Polymers* 2021, 13, 2433.

<https://doi.org/10.3390/polym13152433>

Academic Editor: Sergio Torres-Giner

Received: 29 May 2021

Accepted: 20 July 2021

Published: 23 July 2021

Publisher's Note: MDPI stays neutral with regard to jurisdictional claims in published maps and institutional affiliations.



Copyright: © 2021 by the authors. Licensee MDPI, Basel, Switzerland. This article is an open access article distributed under the terms and conditions of the Creative Commons Attribution (CC BY) license (<http://creativecommons.org/licenses/by/4.0/>).

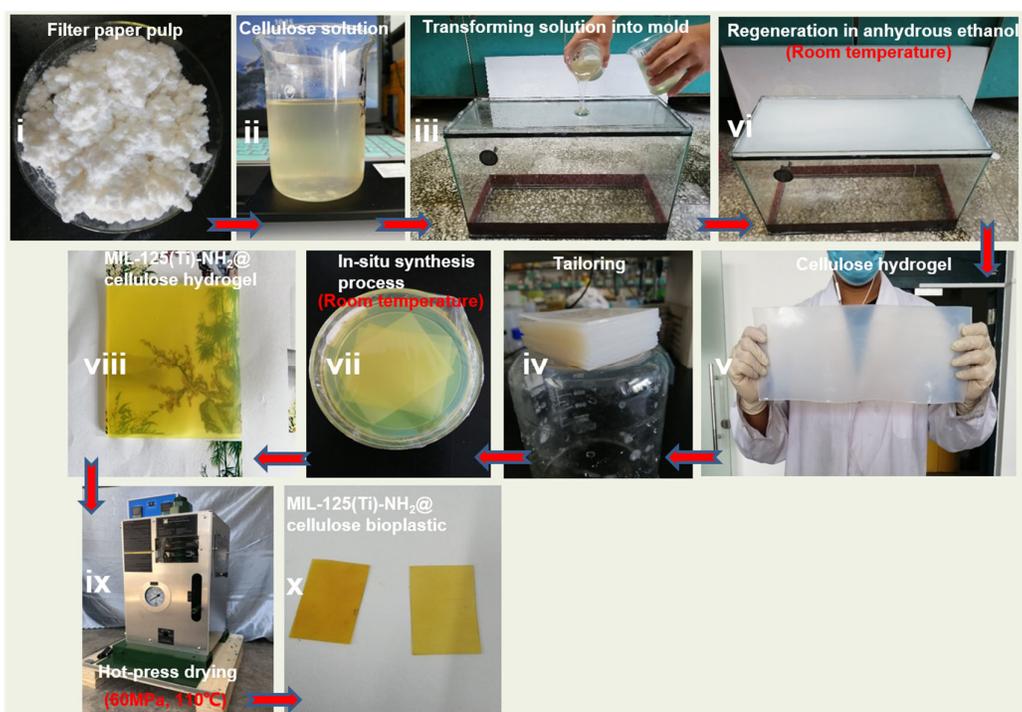


Figure S1. Fabrication of MIL-125(Ti)-NH₂@cellulose bioplastic (MNP@CBP) from filter paper pulp.

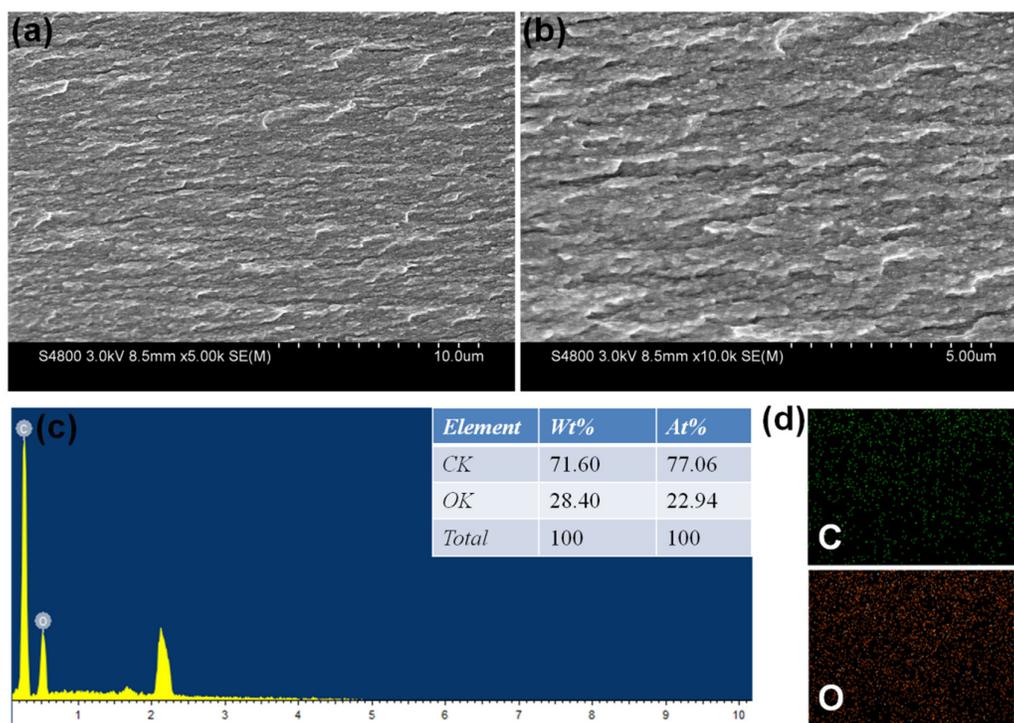


Figure S2. (a, b) Cross-sectional SEM images of CBP; (c) EDS spectrum of CBP; (d) Elemental mapping images of CBP for carbon and oxygen.

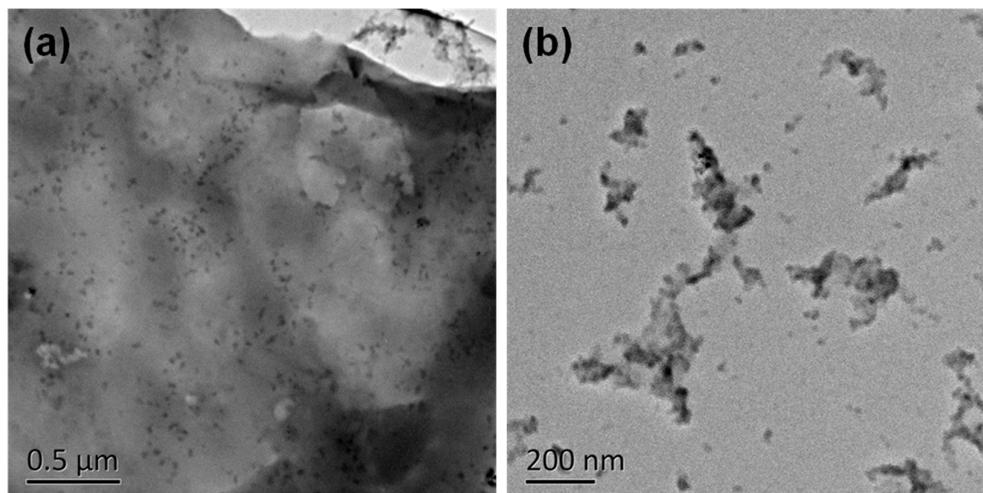


Figure S3. TEM images of MNP@CBP5.

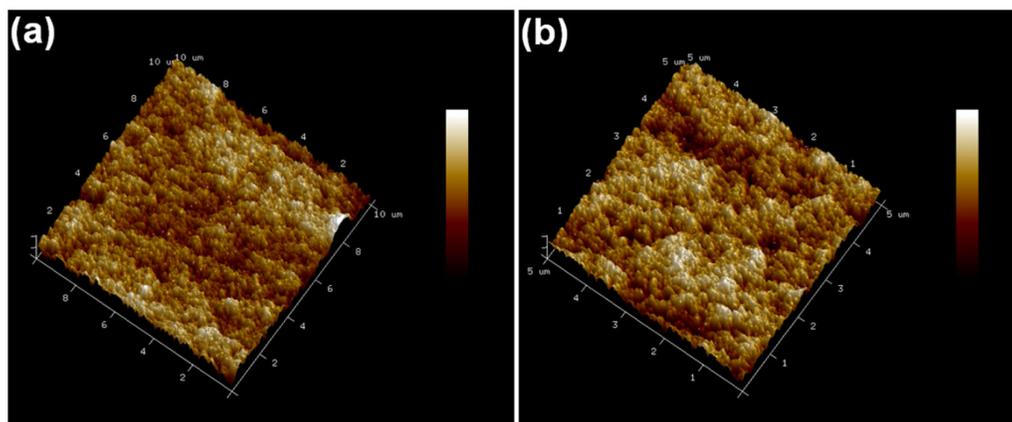


Figure S4. AFM images of pure CBP (a) and MNP@CBP5 (b).

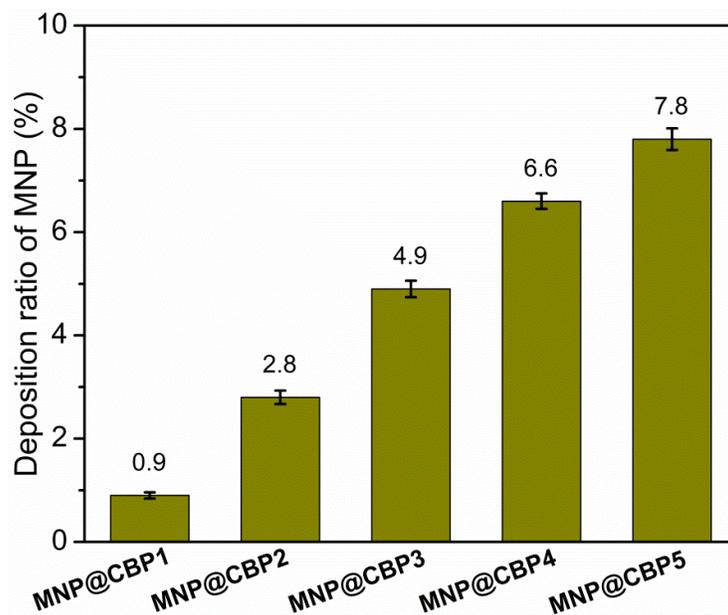


Figure S5. Deposition ratio of MNP into MNP@CBPs.

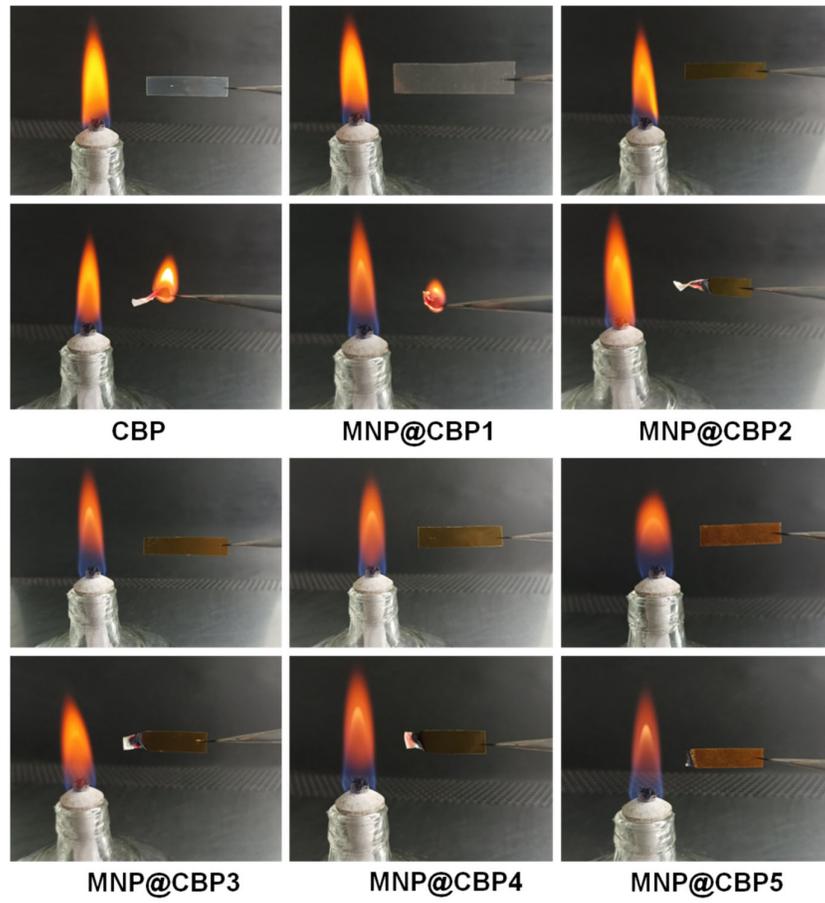


Figure S6. Photos of the samples before and after burning.

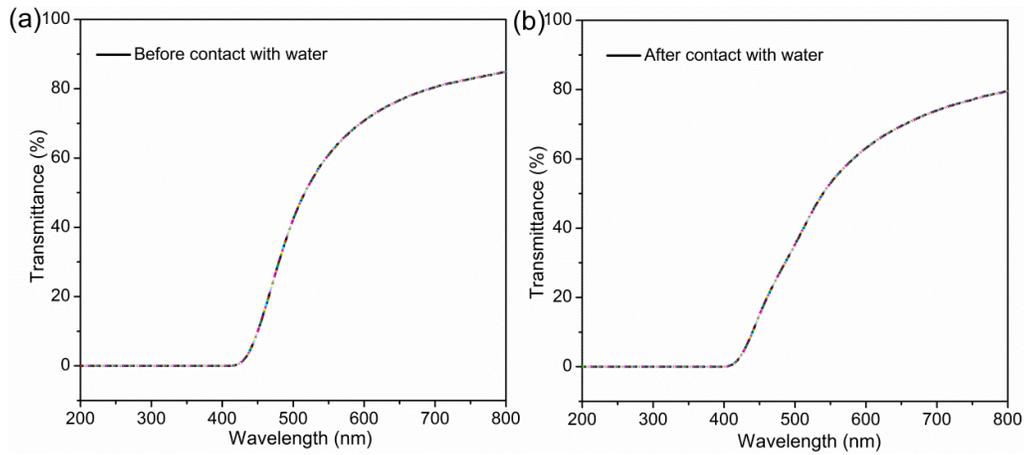


Figure S7. UV transmittance curves of MNP@CBP3 after 12 hours of contact with water.

Table S1. Reagents dosage, reaction time and temperature used for sample preparation.

Sample	TiOiPr (mmol)	NH₂-BDC (mmol)	Time (h)	Temperature (°C)
MNP@CBP1	0.335	0.55	48	25
MNP@CBP2	0.67	1.1	48	25
MNP@CBP3	1.34	2.2	48	25
MNP@CBP4	2.01	3.3	48	25
MNP@CBP5	2.68	4.4	48	25