

Cellulose Nanocrystals Extracted from Rice Husk Using the Formic/ Peroxyformic Acid Process: Isolation and Structural Characterization

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Supporting information

Table S1. Important bands of FTIR spectra for various treated fibers and CNC from RH

Band range (cm ⁻¹)					Changes in functional components	References
Raw	Acid treated	PFA treated	Bleached	CNC		
3438	3455	3428	3407	3418	O-H group stretching vibrations of cellulose's	(Azeh, Olatunji, &

					intramolecular hydrogen bonds	Adekola, 2017; Kumar, Negi, Choudhary, & Bhardwaj, 2014; Mohamed, Salleh, Jaafar, Asri, & Ismail, 2015)
2928	2921	2894	2899	2910	C-H stretching vibration of aliphatic CH ₂ in cellulose, in addition to symmetry and asymmetry stretching vibrations in CNC	(Azeh et al., 2017; Khenblouche et al., 2019; Kumar et al., 2014; Mohamed et al., 2015)
1740	1739	1741	-	-	C-O stretching vibrations of acetyl and uronic ester linkages of the carboxylic group of ferulic and p-coumaric acids in pectin, lignin,	(Kumar et al., 2014; Ray & Sarkar, 2001; Sain & Panthapulakkal, 2006; Tibolla,

					and hemicellulose	Pelissari, Martins, Vicente, & Menegalli, 2018)
1645	1637	1641	1640	1638	O-H characteristic bending vibrations of cellulose's absorbed water	(Kumar et al., 2014)
1515	1517	1520	-	-	Aromatic C-O stretching in lignin	(Kumar et al., 2014)
1425	-	1425	1430	1428	CH ₂ and CH ₃ bending vibrations in cellulose	(Khenblouche et al., 2019)
1247	-	-	-	-	C-O-C out of plane stretching owing to lignin and hemicelluloses' acetyl-aryl ether group	(Mohamed et al., 2015)
1164	1160	1160	1162	1162	C-O-C ring stretchings of β -glycosidic linkages in cellulose's ether group.	(Azeh et al., 2017; Khenblouche et al., 2019; Kumar et al.,

						2014)
-	-	1058	1060	1061		(Luzi et al., 2019)
-	-	1030	1031	1031	C-O-C pyranose ring skeletal vibration in cellulose	(Khenblouche et al., 2019)
895	893	893	893	893	Related to C-O-H out-of-plane bending and cellulose AGU twisting modes	(Azeh et al., 2017; Khenblouche et al., 2019; Luzi et al., 2019)
-	-	615	618	618		

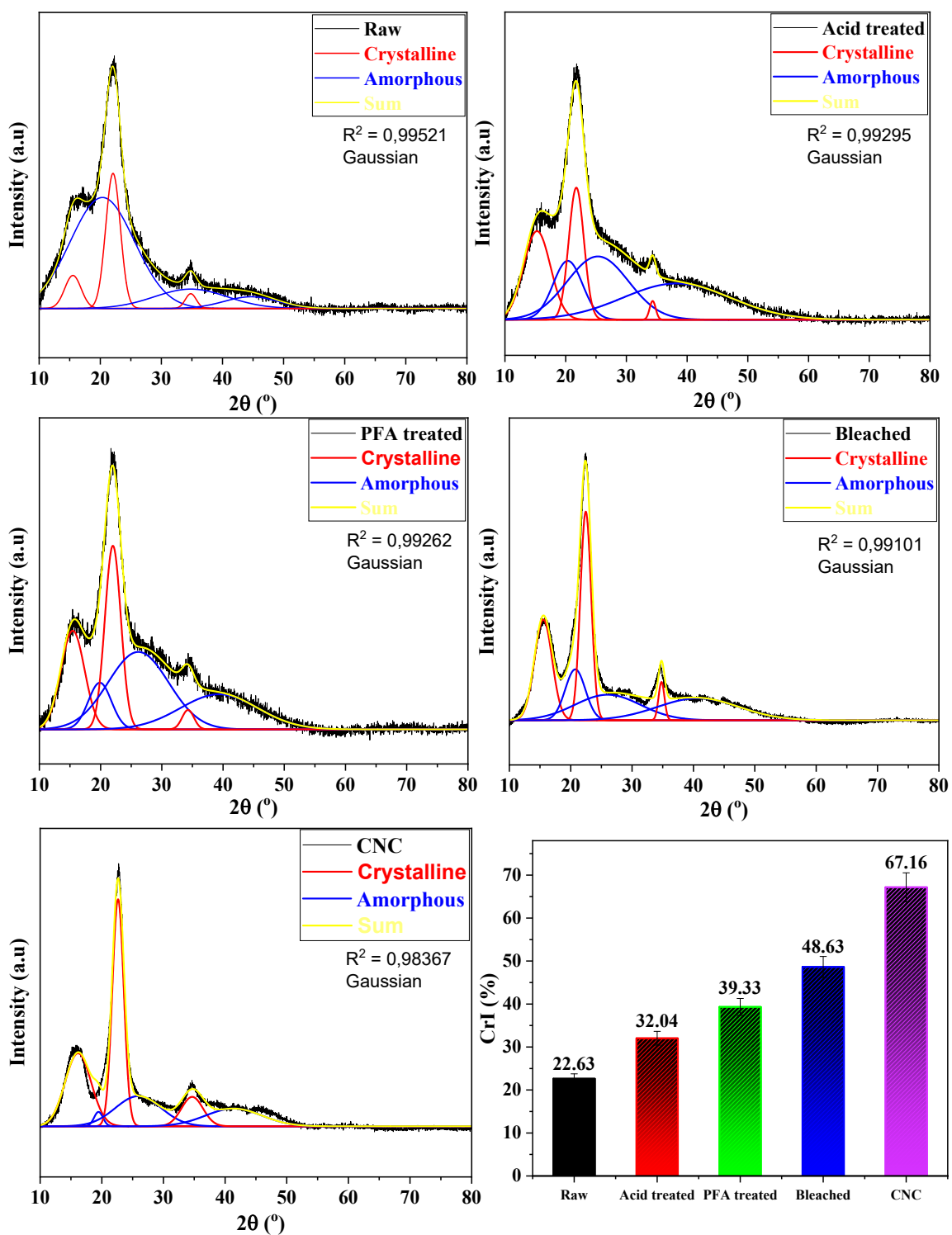


Fig. S1. Each XRD peak of treated RH samples is deconvoluted by crystalline and amorphous peaks and the CrI chart.

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