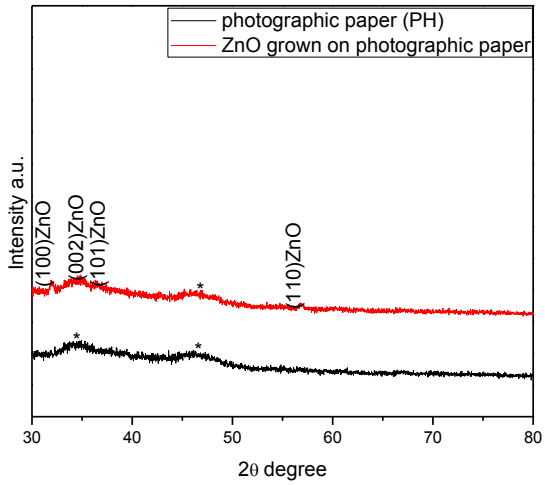
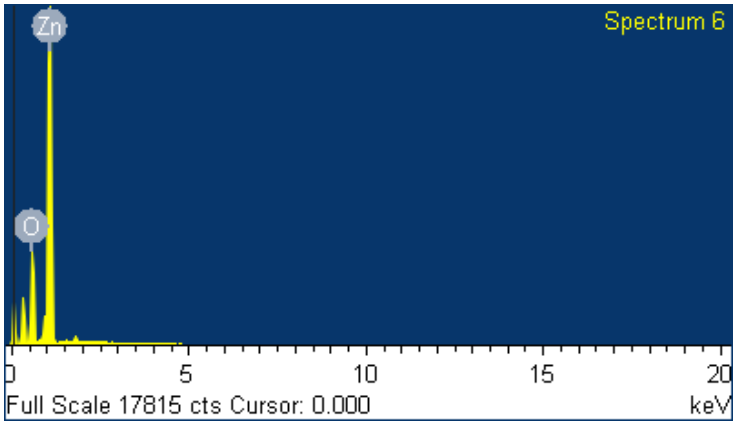
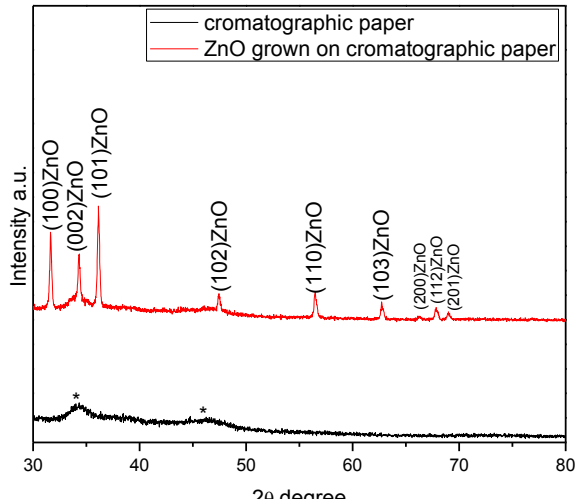
Supporting Information

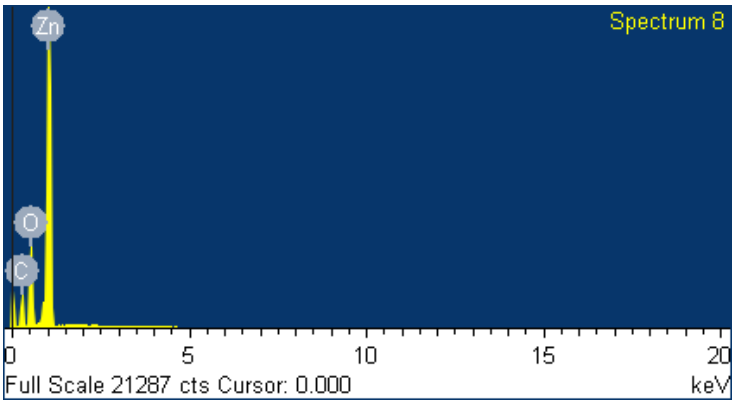
ZnO grown on photographic paper.

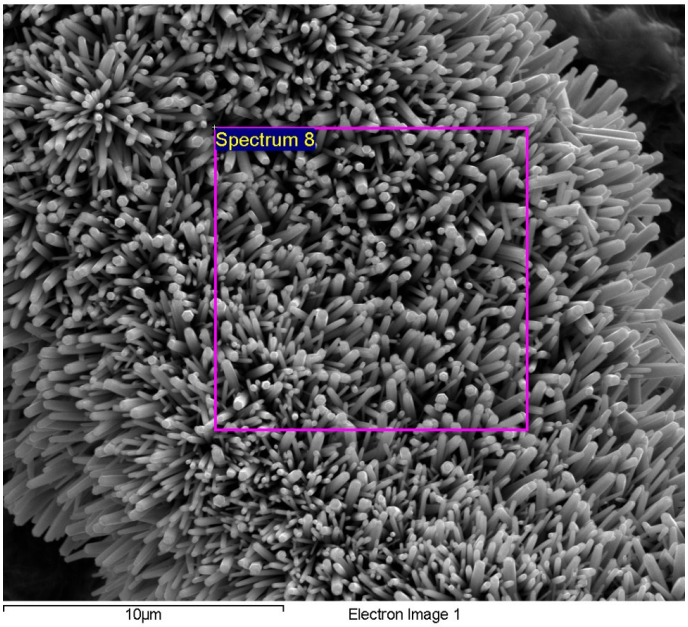




ZnO grown on chromatographic paper.

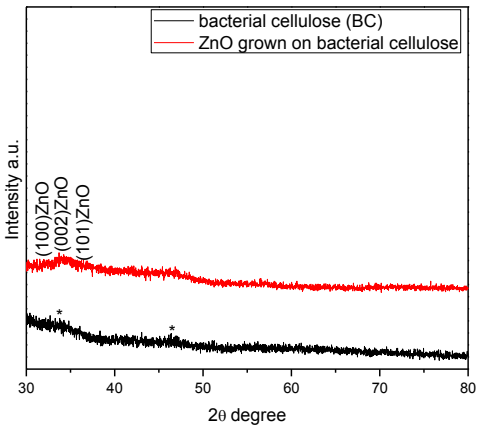






EDS- Spectrum 8 – approximate weight percentage - 18, 81% oxygen and 81,19% zinc

ZnO grown on bacterial cellulose.



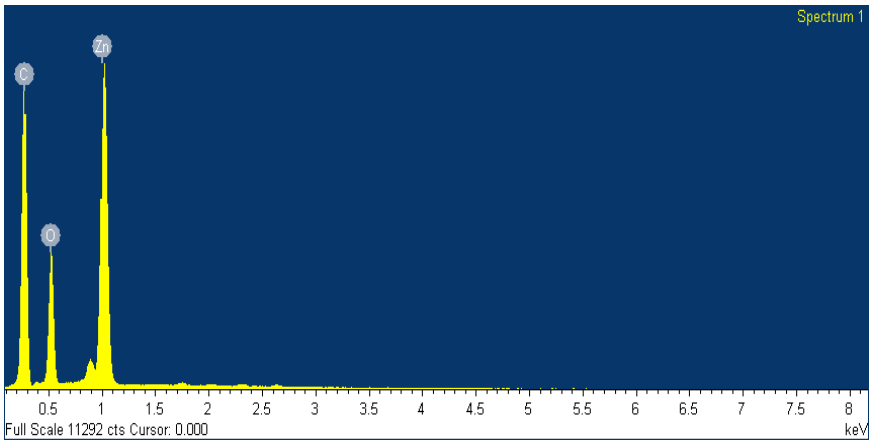


Table 1: Root mean square roughness (RMS) values in different surface areas

Photographic paper - PP	Chromatographic paper - CP	Bacterial cellulose - BC
Area 50x50 µm		
1.556 µm	>5µm	0.381 µm
Area 3x3µm		
0.538 µm	80.1 nm	0.445 µm

Table 2: Root mean square roughness (RMS) values for the substrates, before and after seed layer deposition

Substrate	Before	After
PP	538nm	1507nm
CP	80.1nm	241nm
BC	445nm	153nm

Table 3: Concentration of Zn^{2+} just after deposition of the seed layer solution, obtained through EDX analysis.

Substrate		Standard deviation
PP	~1.2%	0.50
CP	~0.21%	0.07
BC	~1.12%	0.91

AFM images were also obtained (3 × 3 µm) just after the deposition of the seed layer solution to verify the swelling of the substrates. The RMS values for the substrates are shown in the ESI† (Table S2). The roughness of the CP substrate slightly increased (from 80 to 241 nm), suggesting that the fast deposition of the seed layer does not have a strong impact on the swelling of this substrate. In contrast, for the PP substrate, the RMS value increased to a great extent (from 0.538 to 1.507 µm), probably because of the swelling of the voids/cracks, turning the paper rougher. Comparing the three substrates, this paper is the less homogeneous one.

Interestingly, the water uptake by the BC substrate led to a smoother surface, as the RMS value decreased from 0.445 to 0.153 µm. For this substrate, well known for its water holding capacity, contrary to plant cellulose, water uptake was beneficial in terms of its roughness.