Electronic Supplementary Material (ESI) for Journal of Materials Chemistry C


# Supporting information

## Highly Transparent and Writable All-Wood Cellulose Hybrid Nanostructured Paper

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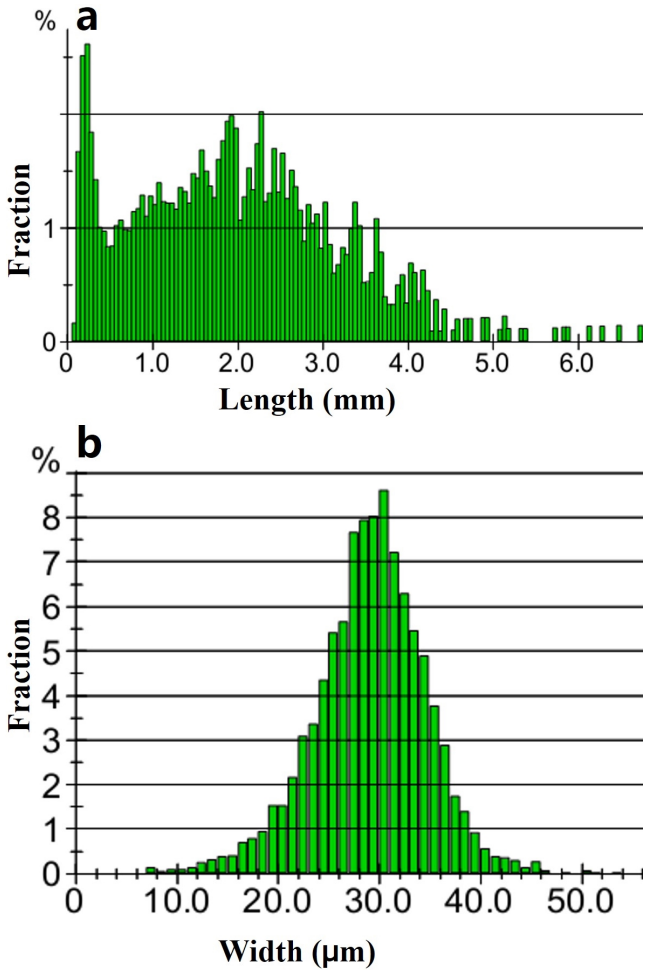


**Fig S1**. a) Wood fiber length-weighted length distribution. b) Wood fiber length-weighted length distribution

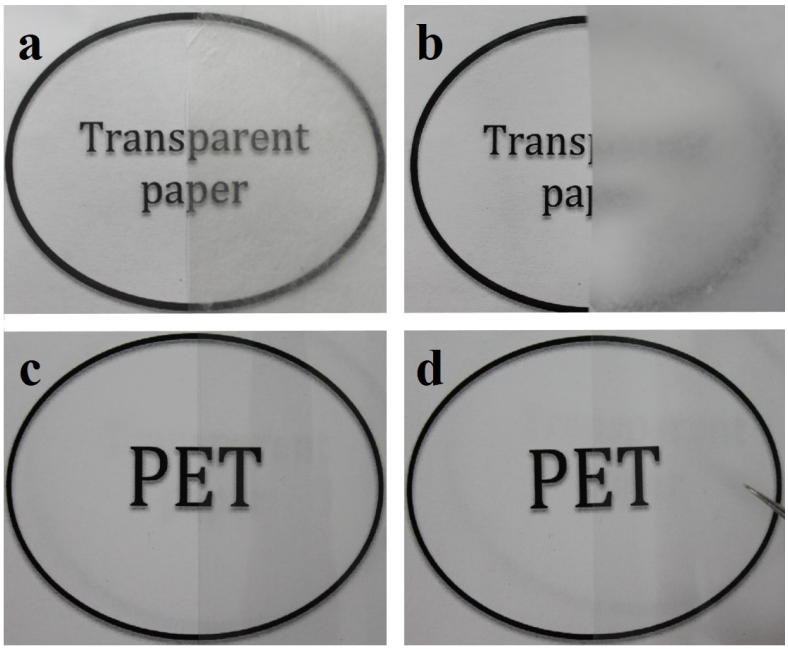


**Fig S2**. Digital photos and haze for cellulosic paper and PET, a) Hybrid paper（60 wt % NFC）places closely to pattern to show the high transmittance, and b) the same hybrid paper at a distance of 1 inch from the underneath pattern to show the high haze c) PET contacts tightly to pattern underneath to indicate the high transmittance of PET. d) The same PET at a distance of 1 inch from the underneath pattern to show the low haze.

There was a striking difference between the haze of cellulosic paper including 60 wt % NFC and that of PET. Transparent paper and PET were placed closely to the substrate and the pattern is clearly visible. When the transparent paper was 1 inch away from substrate the pattern becomes obscure, however, the pattern is clearly visible no matter how far the distance it is from PET.

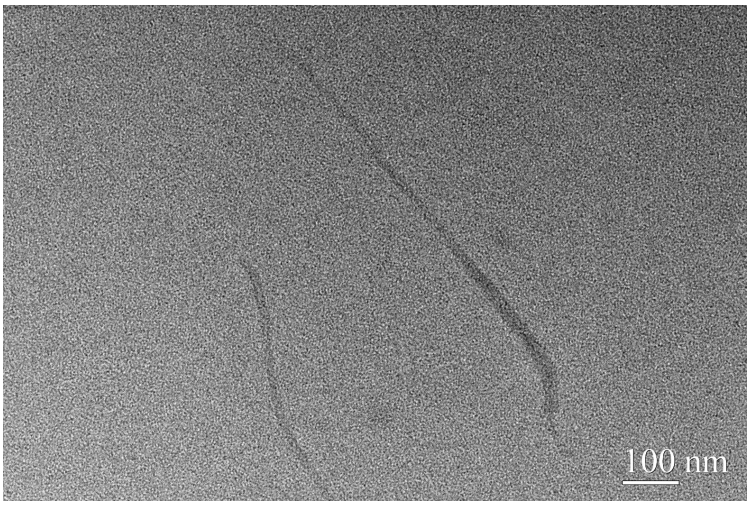


**Fig S3**. TEM image of NFC


**Fig S4.** Morphology of unbeaten wood fibers

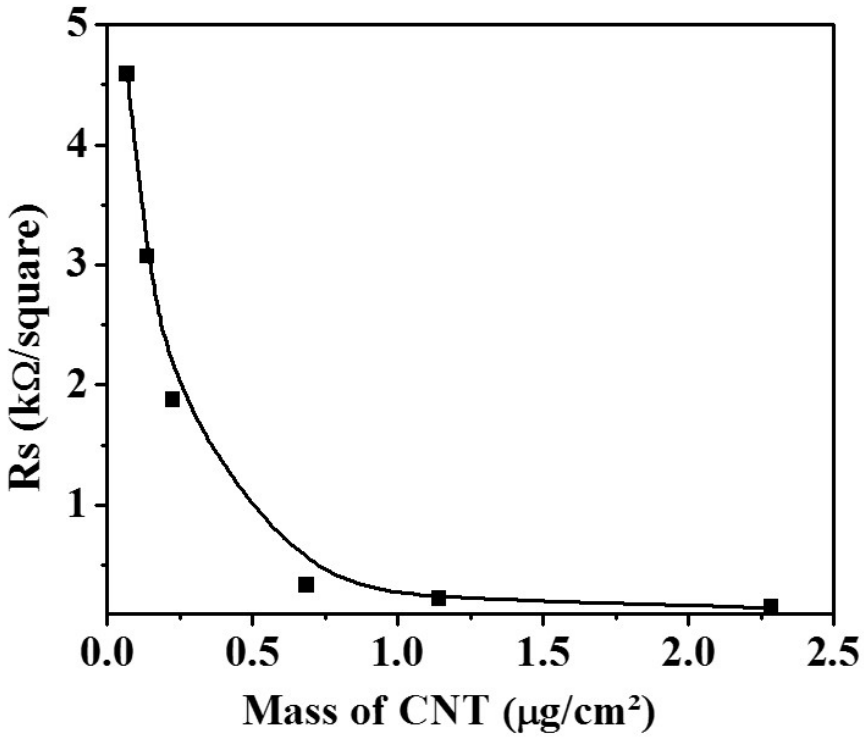


**Fig S5**. The sheet resistance of CNTs-coated transparent paper at various masses of CNTs.

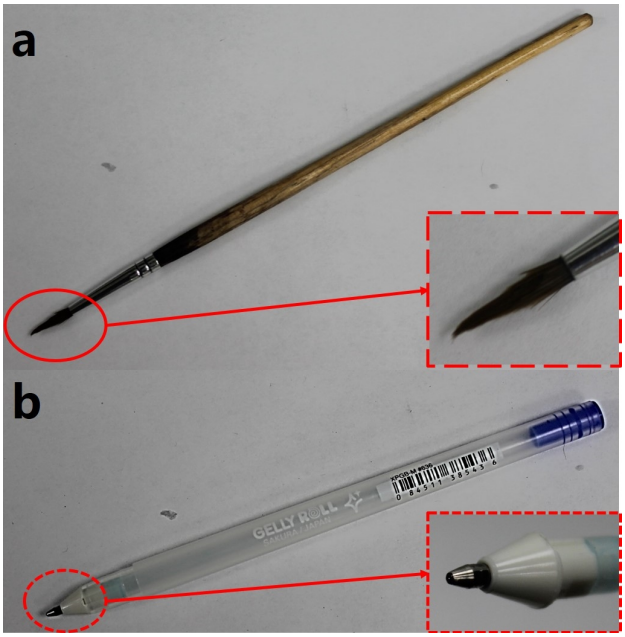


**Fig S6**. a) Picture of brush that used to write letter on the hybrid paper, inset is the tip of brush.

b) Digital image of rollerball pen that used to draw circuit on the hybrid paper.

**Table S1** Dimension of unbeaten wood fibers

| Average length (mm) | Average width (μm) | Fine content (%) |
|---|---|---|
| 1.95 | 27.16 | 6.96 |

**Table S2** Formula for fabrication of transparent hybrid paper

| | Wood fiber (g) | NFC (g) |
|---|---|---|
| 1 | 0.162 | 0 |
| 2 | 0.162 | 0.069 |
| 3 | 0.162 | 0.133 |
| 4 | 0.162 | 0.243 |

**Table S3** Basic information of transparent hybrid paper

| | Grammage ($g/m^2$) | Thickness (μm) | Content of NFC (%) |
|---|---|---|---|
| 1 | 25.0 | 55 | 0 |
| 2 | 35.6 | 57 | 30 |
| 3 | 44.0 | 47 | 45 |
| 4 | 59.1 | 61 | 60 |