**Carbon nanotube-cellulose ink for rapid liquid identification**

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**Supplementary Information – part 1**

The water-based carbon nanotube (CNT) ink was produced by direct dispersing functionalized CNTs in water. The CNTs were produced by Chemical Vapor Deposition (CVD) [1] and the functionalization was carried out via a modified oxidation process as reported elsewhere [2]. The CNTs were poured in water at a concentration of 1 %(w/v) and dispersed under sonication for 3h. The resultant suspension was centrifugated until a uniform ink was obtained, with concentration varying between 0.4-0.6 %(w/v). Some characterizations of the CNTs are presented in figure S1.



(a)

(b)

Figure S1 – Typical morphology and characteristics of the functionalized multi-walled carbon nanotubes (MWCNTs) used in this work (a) SEM image; (b) TEM image; (c) Thermogravimetric Analyses; (d) Raman spectra; (e) CNT ink; (f) thin film SEM image from spray-deposited ink.

Further characteristics are as follows:

* Viscosity: ~ 1.0 mPa.s
* Tube diameter: 10-30 nm
* Tube Length: 1-5 µm
* Sheet resistance (10 µm - width): 103 Ω/□

**Supplementary information – part 2**

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| **PCA features variables** |
| **Variable** | **Definition** | **Algorithm** |
| *Area* | Area of gain (S) curve data    | *Area = sum(S)* |
| *max* | Maximum value of the gain (S) curve  | *max = max(S)* |
| *t\_max* | time corresponding to the *max* position  | *tmax =time(max)*  |
| *slope* | Slope of a line passing through (0,0) and (tmax, max) | *slope = max/tmax* |
| *reslope* | The *slope*^(-1)  | *reslope = slope-1* |
| *maxdev* | Maximum value of the numeric differential of gain (S) curve  | *maxdev = max(diff(S))* |
| *mindev* |  Minimum value of the numeric differential of gain (S) curve | *mindev = min(diff(S))* |
| *ratio\_minmax* | Ratio of min\_dev and max\_dev | ratiominmax = maxdev/mindev |
| *WAHM* | Width of the curve measured at a factor of maximum λ. | WAHM = time2(max. \* λ) - time1(max. \* λ)  |

[1] DA CUNHA, THIAGO H.R.; DE OLIVEIRA, SERGIO; MARTINS, ICARO L.; GERALDO, VIVIANY; MIQUITA, DOUGLAS; RAMOS, SERGIO L.M.; LACERDA, RODRIGO G.; LADEIRA, LUIZ O.; FERLAUTO, ANDRE S. High-yield synthesis of bundles of double- and triple-walled carbon nanotubes on aluminum flakes. CARBON, v. 133, p. 53-61, 2018.

[2] CASTRO, VINÍCIUS; COSTA, INGRID; LOPES, MAGNOVALDO; LAVALL, RODRIGO; FIGUEIREDO, KÁTIA; SILVA, GLAURA. Tailored Degree of Functionalization and Length Preservation of Multiwalled Carbon Nanotubes by an Optimized Acid Treatment Process. JOURNAL OF THE BRAZILIAN CHEMICAL SOCIETY, v. 28, p. 1158, 2016.