Supporting Information (ESI)

# Chemical Control of Superhydrophobicity of Carbon Nanotube Surfaces: Droplet Pinning and Electrowetting Behavior

**Bhalchandra A. Kakade***

***Received (in XXX, XXX) Xth XXXXXXXXX 20XX, Accepted Xth XXXXXXXXX 20XX***
**DOI: 10.1039/b000000x**

## Elemental Analysis

**Table S1.** Elemental analysis of all MWCNT paper samples, showing varying percentage of elements responsible for different extent of wetting.

| Sample | Carbon | Hydrogen | Oxygen | Nitrogen | Sulphur |
|---|---|---|---|---|---|
| A. Pristine | 92.11 | 0.593 | 7.297 | - | - |
| B. Nitric acid treated | 84.09 | 0.900 | 14.607 | 0.403 | - |
| C. Ozonolyzed | 85.42 | 1.091 | 13.489 | - | - |

In order to substantiate the surface changes after nitric acid treatment and ozonolysis, the elemental analysis is very useful. Accordingly, Table S1 exhibits the elemental contents of all nanotube samples after various oxidation processes, although, an approximate estimate has only been obtained by this method. Sample 'C' does not show any impurities of sulphur due to the usage of quenching agent DMS after ozonolysis. Since it is the aim of the present study to understand the wetting behavior of nanotubes, removal of all adsorbates/impurities is crucial. Hence, it could be evidenced from elemental analysis that all sulphur impurities are removed after washing with excess of dichloromethane.

## Thermogravimentry Analysis

Effect of thermal treatment on the bucky papers is generally very important for validating the purity of these samples. Accordingly, Figure S1 exhibits the thermograms of all nanotube samples performed in dry nitrogen at a heating rate of 10 $^{o}$C/min. The initial slow weight loss, in all cases, up to 570 $^{o}$C is attributed to adsorbed water (moisture) or molecular oxygen, whereas, the onset of weight loss at 600 $^{o}$C could be attributed to the actual decomposition of carbon. A sharp and distinct single weight loss at 730 $^{o}$C also suggests clear evidence for negligible amorphous carbon content in the as-synthesized sample. Both the weight losses for

*SRM Research Institute, SRM University, Kattanakulathur, Chennai - 603 203, India. Fax: (+91) 44-27453903; Tel: (+91) 44-27417920; E-mail: bhalchandrakakade@gmail.com*

samples A and B are slightly different from that of sample C, revealing varying extent of oxygenated species in all CNT samples. Further, the final weight losses also significantly differ, suggesting the presence of more or less oxygen necessary for their complete decomposition. Incidentally, the sample 'A' contains plenty of moisture revealing almost 14% weight loss as compared to about less than 10% for other samples. The presence of 14% moisture is sufficient to decompose the total weight (even up to 85%), although not enough to complete the decomposition to 100%. On the other hand sample 'C' shows only 20% weight loss throughout, indicating very less extent of oxygenated functional groups (thanks to large –-$CH_3$ groups formed after ozonolysis). However, it would be difficult to predict the presence of any trace of sulphur present (due to quenching agent dimethylsulphide) in the sample.

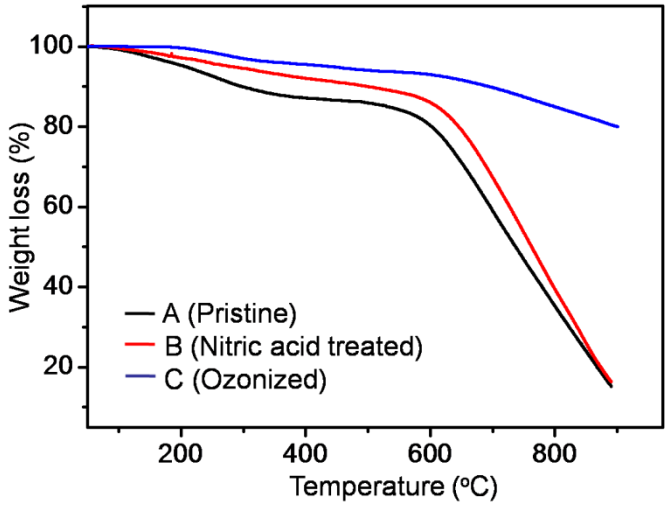


**Fig. S1.** TG profiles of all MWCNT samples.

*SRM Research Institute, SRM University, Kattanakulathur, Chennai - 603 203, India. Fax: (+91) 44-27453903; Tel: (+91) 44-27417920; E-mail: bhalchandrakakade@gmail.com*