

1 Extraction and Quantification of Carbon Nanotubes in Biological Matrices with Application to
2 Rat Lung Tissue

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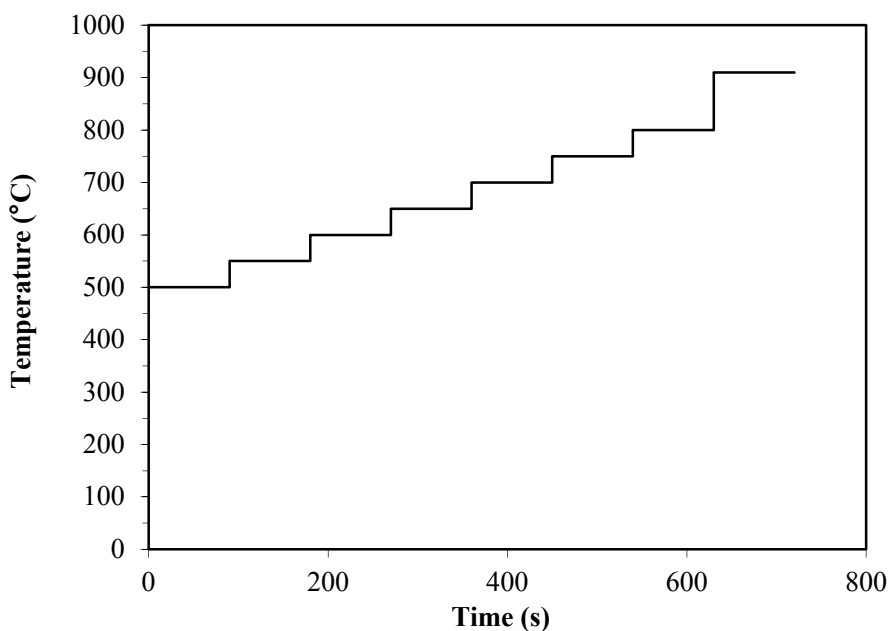
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22 Keywords: Carbon nanotube, rat lung, extraction, digestion

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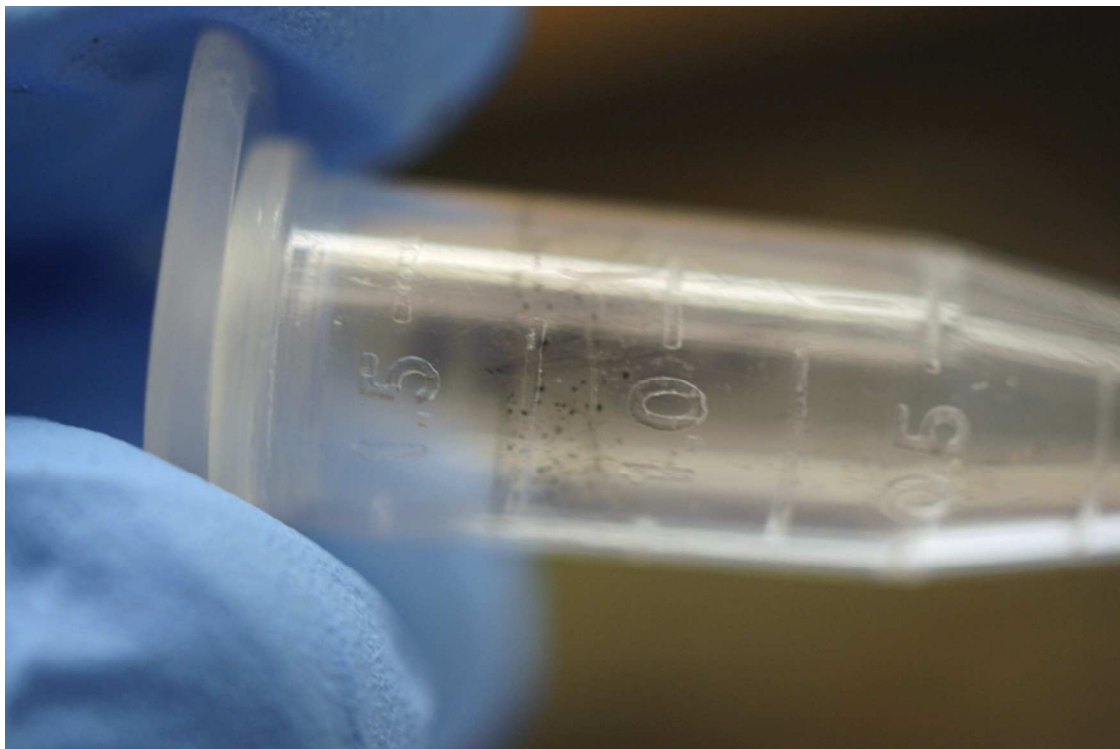
24 **SUPPORTING INFORMATION**

25 Figure SI-1 shows a sample temperature program for 90% He/10% O₂ conditions for
26 quantifying CNTs using PTA. The number of temperature steps and the residence time can be
27 manipulated to better suit the analysis requirements. For example, for S-CNT quantification, the
28 residence time for the final temperature step (910°C) should be extended to ensure full evolution
29 of S-CNTs.



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31 Figure SI-1. PTA program for evaluating CNTs under 90% He/10% O₂.

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33 Figure SI-2 shows an example photograph of CNTs sticking to the sidewall of the plastic
34 micro centrifuge vial after treatment with problematic reagents such as H₂O₂ and HCl. Side wall
35 sticking was observed for both conical and round-bottom centrifuge vials.



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37 Figure SI-2. Photograph showing an example of CNTs sticking to the sidewall of a plastic
38 centrifuge vial after treatment with a problematic reagent (*e.g.*, H₂O₂, HCl).

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40 Figure SI-3 shows a photograph of functionalized W-CNTs centrifuged to a pellet after
41 treatment with Solvable. The compact pellet formation indicates the ability of Solvable to allow
42 for agglomeration of stable CNTs, which is similar behavior to non-functionalized CNTs.

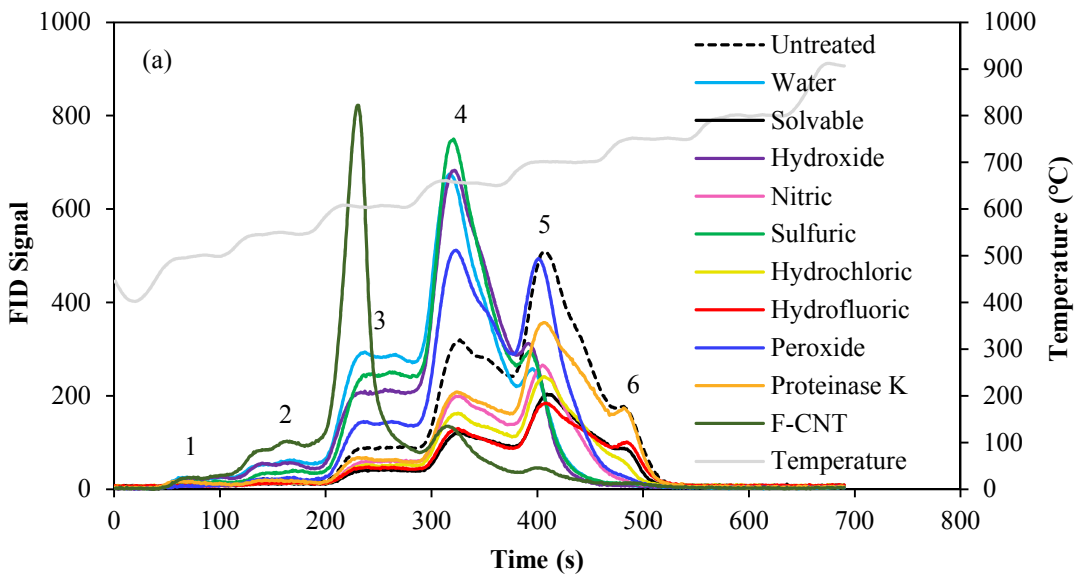


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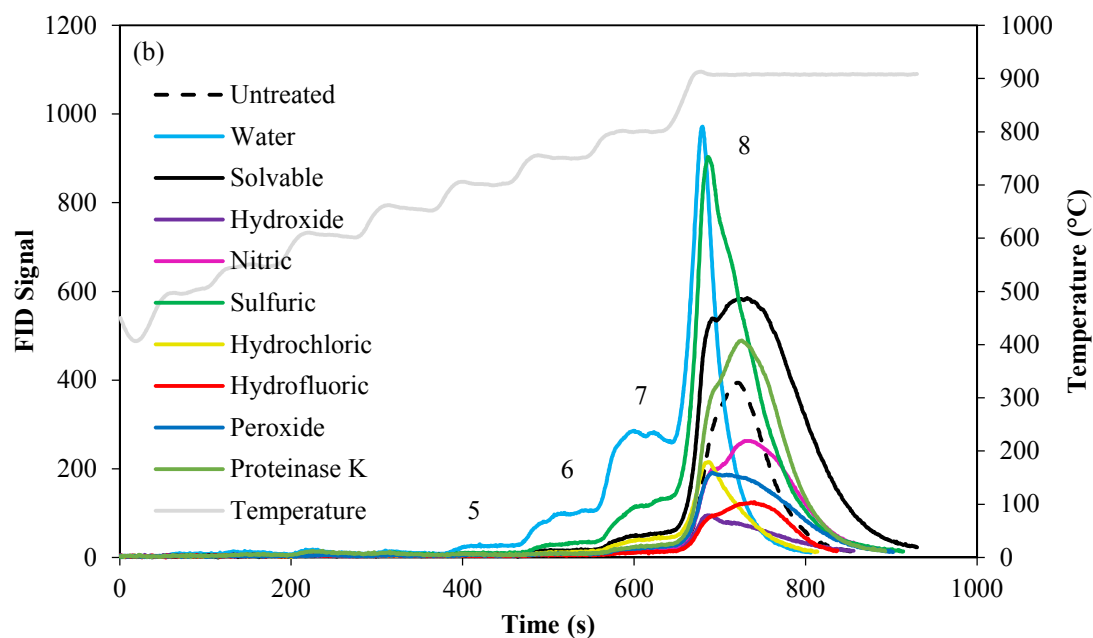
44 Figure SI-3. Photograph showing functionalized W-CNT pellet following treatment with
45 Solvable and centrifugation.

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47 Figure SI-4 shows the PTA thermograms for S-CNTs and W-CNTs after being treated
48 with different reagents (PTA oxidizing conditions, 90% He/10% O₂). The numbers above each
49 peak (1 through 8) represent a temperature step. To evaluate the thermograms, these peaks were
50 normalized to the total thermogram area to get a peak fraction. This peak fraction indicates
51 which peak had the greatest CNT evolution, which can be used to evaluate the thermal stability
52 of the CNT. For quantification purposes, the FID signal (y-axis) is converted to carbon mass (μg)
53 using an internal standard (methane).



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 56 Figure SI-4. Thermograms for (a) W-CNTs and (b) S-CNTs after treatment with the chemical
 57 digestion reagents. Numbers (1–8) above the FID signal correspond to peak numbers as defined
 58 by the temperature steps. FID corresponds to mass of carbon evolved.

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