Supplementary Materials

Estimating the Reducing Power of Carbon Nanotubes and Granular Activated Carbon Using Various Compounds

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Section 1. The methods for measuring the concentration of Fe(II) and Cr(VI) were modified from Tamura et al. (1974) [34] and Clesceri et al. (1998) [35], respectively. More details are as follows.

Fe(II) measurement by modified 1,10-phenanthroline method:

1. Preparation of 1,10-phenanthroline solution by mixing (1) ammonium acetate 25 g + deionized water (DW) 15 mL + acetic acid 70 mL, (2) sodium acetate 2.5 g + DW 10 mL, (3) 1,10-phenanthroline 0.2 g + DW 200 mL, and (4) hydrochloric acid 10 mL
2. Take 1 mL of sample and put it in a vial
3. Add 1 mL of DW and 2 mL of the 1,10-phenanthroline solution prepared to the vial
4. Shaking the vial vigorously for 1 min by hand and allow the sample solution to sit at room temperature for a minimum of 15 min.
5. Measure the absorbance of each sample solution at 510 nm using a UV−vis spectrophotometer.

Cr(VI) measurement by modified 1,5-dipenylcarbazide method:

1. Preparation of the coloring reagent for Cr(VI) measurement by mixing 0.25 g of 1,5-diphenylcarbazide and 50 mL of acetone
2. Take 0.5 mL of sample and put it in a vial
3. Add 0.1 mL of the coloring reagent, 0.2 mL of 10% sulfuric acid, and 2.2 mL of DW to the vial
4. Shaking the vial vigorously for 1 min by hand and allow the sample solution to sit at room temperature for a minimum of 15 min.
5. Measure the absorbance of each sample solution at 540 nm using a UV−vis spectrophotometer.

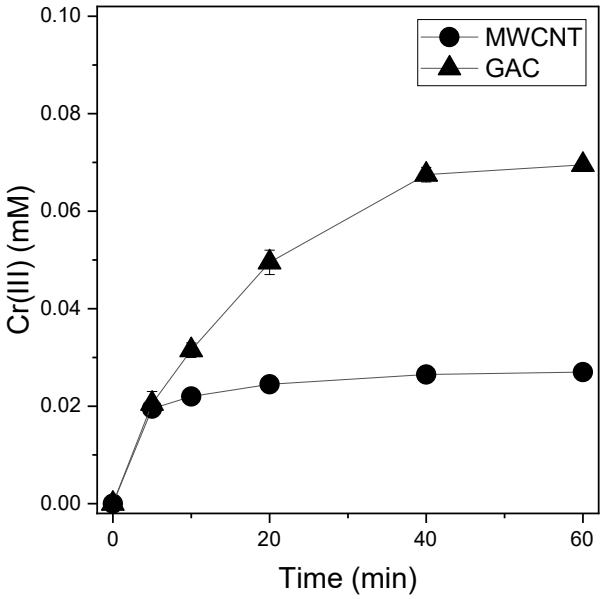

Figure S1. Reduction of Cr(VI) to Cr(III) by MWCNT and GAC at acidic pH condition ($[Cr(VI)]_o$= 0.1 mM, [MWCNT-Comocat]$_o$= $[GAC]_o$= 2.0 g/L, $[pH_o$= 2.5], anaerobic condition, [reaction time = 60 min]). .

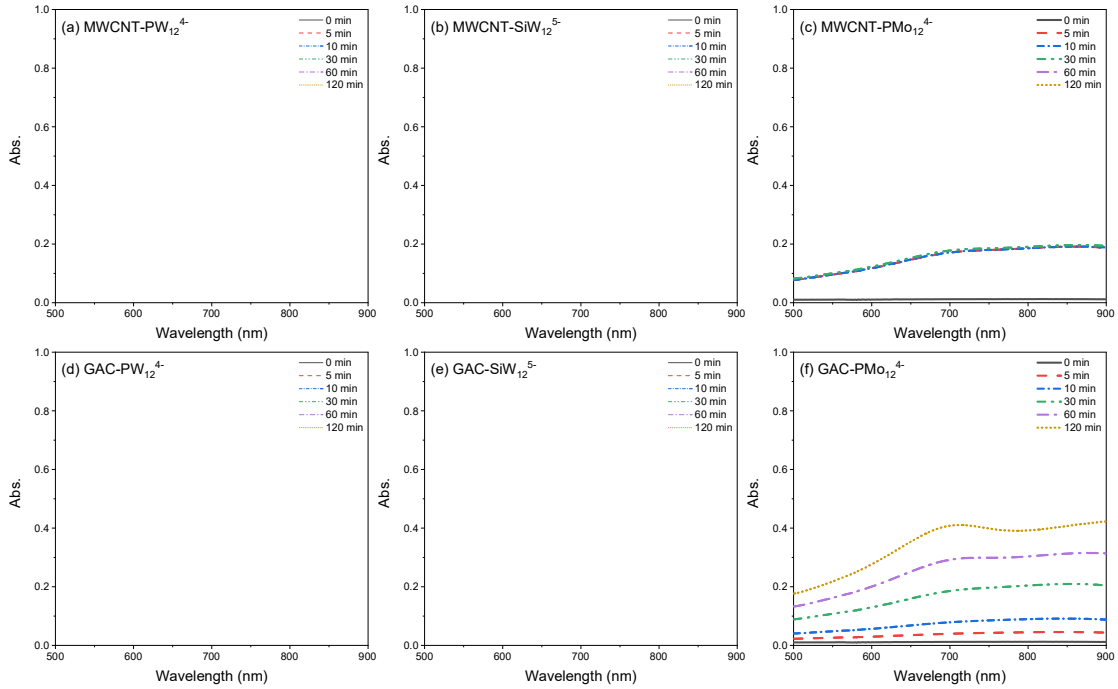

Figure S2. Time profile of $PW_{12}O_{40}^{4-}$, $SiW_{12}O_{40}^{5-}$ and $PMo_{12}O_{40}^{4-}$ production in the presence of MWCNT and GAC systems at acidic pH condition ($[PW_{12}O_{40}^{3-}]_o$= $[SiW_{12}O_{40}^{4-}]_o$= $[PMo_{12}O_{40}^{3-}]_o$= 1.0 mM, [MWCNT-Comocat]$_o$= 2.0 g/L, $[pH]_o$=2.5, anaerobic condition, [reaction time = 120 min]).

References

34. Tamura, H.; Goto, K.; Yotsuyanagi, T.; Nagayama, M. Spectrophotometric Determination of Iron(II) with 1,10-phenanthroline in the Presence of Large Amounts of Iron(III). *Talanta* **1974**, *21*, 314–318.

35 Clesceri, L.S.; Greenberg, A.E.; Eaton, A.D. *Standard Methods for the Determination of Water and Wastewater*, 20th ed.; United Book Press, Inc.: Baltimore, MD, USA, 1998.