

Supplementary Materials: Activation of Aspen Wood with Carbon Dioxide and Phosphoric Acid for Removal of Total Organic Carbon from Oil Sands Produced Water: Increasing the Yield with Bio-Oil Recycling

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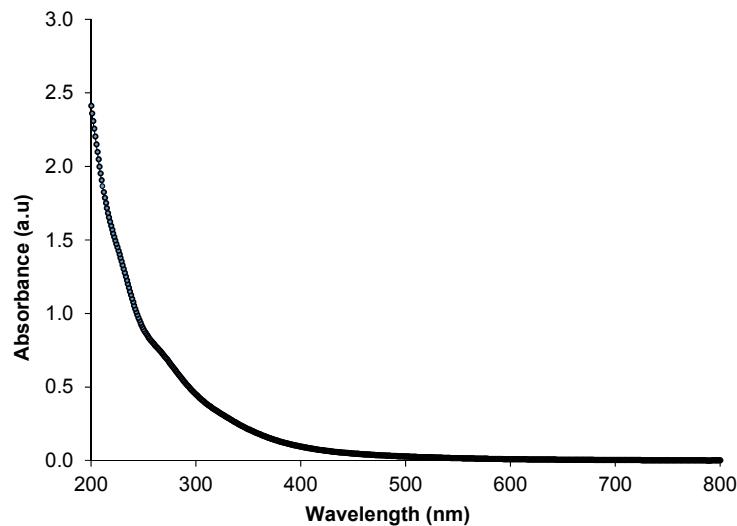


Figure S1. UV-vis spectrum of SAGD water after 25 times dilution with deionized water.

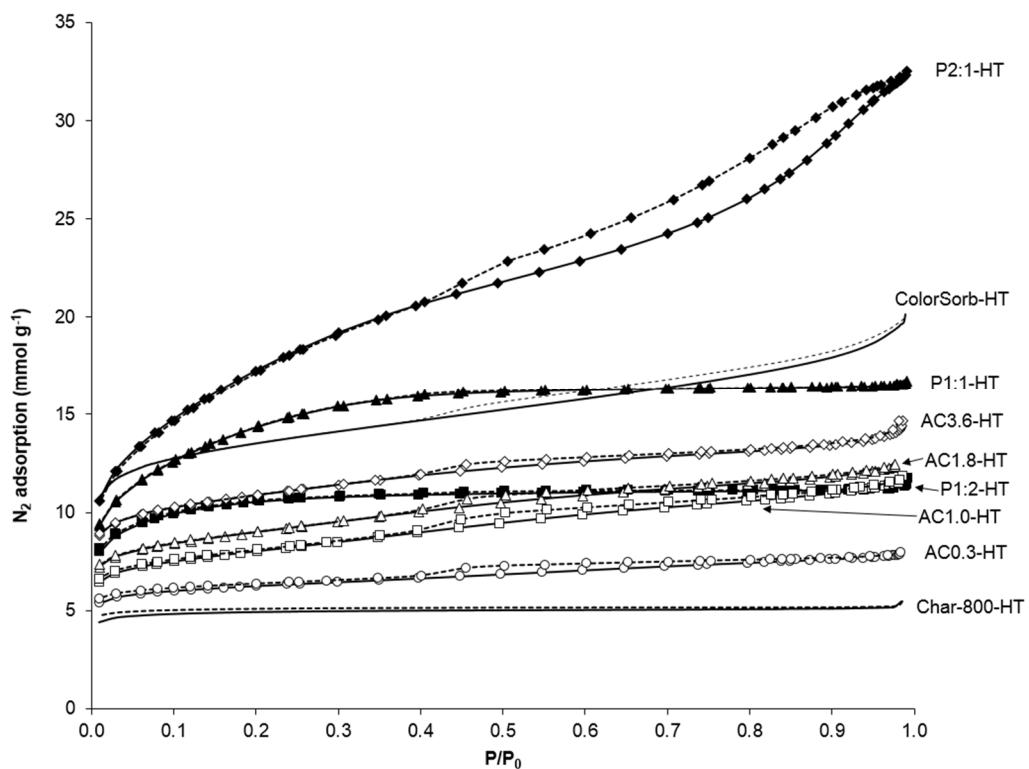


Figure S2. Selected N₂ adsorption (solid lines) and desorption (dotted lines) isotherms of the activated carbons.

Figure S2 shows adsorption isotherms of the non-activated char and activated carbons. The N_2 uptake by Char-800-HT exclusively at relative pressures P/P_0 below 0.1 indicates the highly microporous structure with narrow pore size distribution of this sample. N_2 adsorption capacities (isotherm plateau and nitrogen adsorption) of the CO_2 activated carbons increased with longer activation time. Evidence for the formation of micropores in these samples includes the increased N_2 uptake at P/P_0 below 0.1, while evidence for the formation of meso/macropores includes the lack of a plateau and a hysteresis loop. In H_3PO_4 activated carbon samples, the widening of pores and development of mesopores were enhanced by the higher H_3PO_4 : wood ratio.

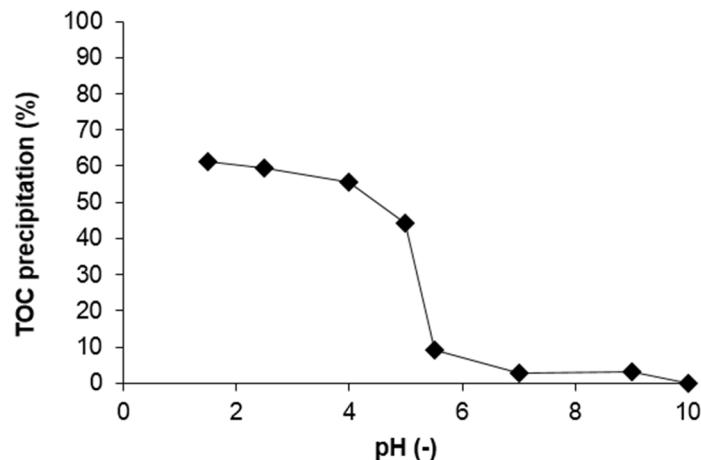


Figure S3. The influence of pH on the precipitation of TOC from SAGD water. The symbols correspond to the measurements, and the lines are only to guide the eye.

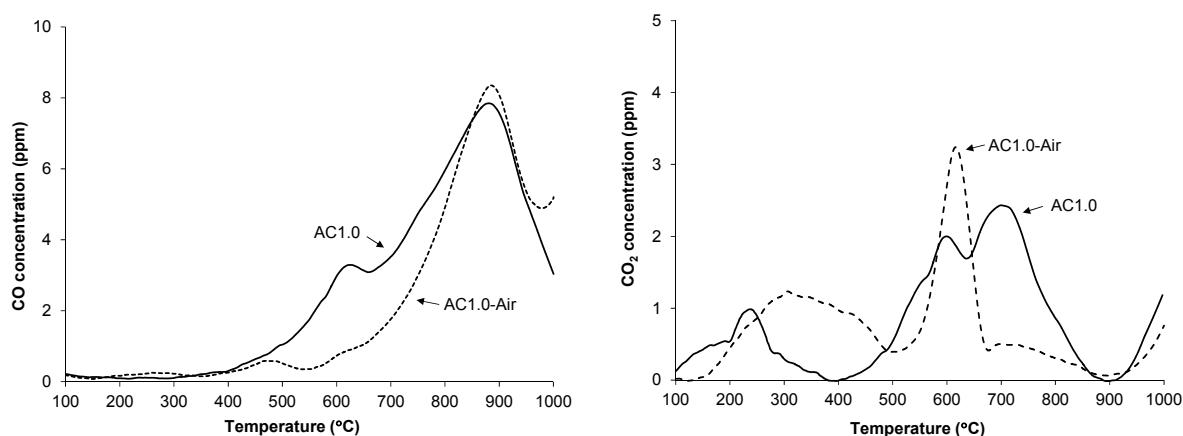


Figure S4. The CO (left) and CO_2 (right) TPD profiles of the carbon samples.