10.1071/EN18079_AC

Environmental Chemistry 2018, 15(6), 336-350

Supplementary Material

Probing Molecular Interactions between Humic Acid and Surface-grafted Polyacrylamide using Quartz Crystal Microbalance with Dissipation and Atomic Force Microscopy: Implication for Environmental Remediation

Omar Maan[1,§], *Jun Huang*[2,§], *Hongbo Zeng*[2], *Qingye Lu*[1]*

[1]Department of Chemical and Petroleum Engineering, University of Calgary, Calgary, AB, T2N 1N4, Canada; [2]Department of Chemical and Materials Engineering, University of Alberta, Edmonton, AB, T6G 2V4, Canada

[§]O.M. and J.H. contributed equally to the work

*Correspondence to: email: qingye.lu@ucalgary.ca

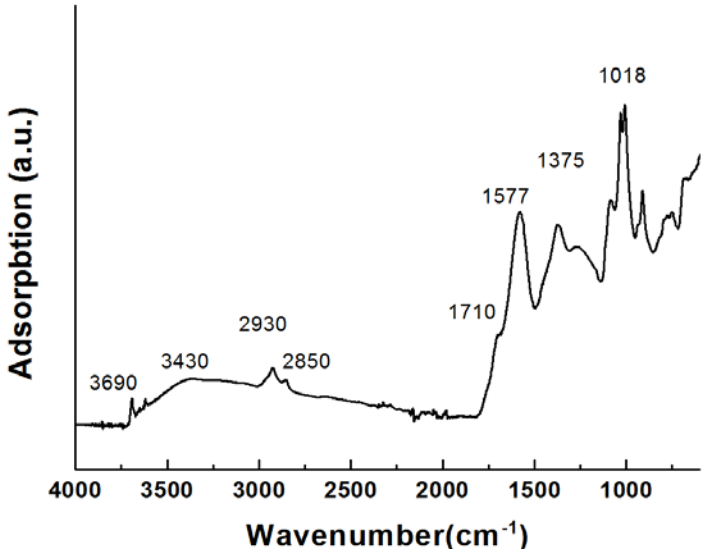

Figure S1. Attenuated total reflection Fourier Transform infrared spectroscopy (ATR-FTIR) of humic acid (HA).

Attenuated total reflection Fourier Transform Infrared (ATR-FTIR) spectroscopy was applied to characterize the functional groups of humic acid used in this study. As shown in Figure S1, The absorption bands in the range between 3200 and 3500 cm^{-1}, with a broad peak at 3430 cm^{-1} are OH stretching vibrations of -OH groups which may include alcohols, phenols and carboxylic acids. The bands at 2930 and 2850 cm^{-1} can be attributed to aliphatic C-H stretching. The stretching vibration of the aromatic C-H bonds, usually visible in the 3200-3000 cm^{-1} region, may be masked by the broad O-H signal. The shoulder peak at 1710 cm^{-1} can be assigned to the C=O stretching of carbonyl groups, which may include carboxylic groups, ketone groups. The peak at 1577 cm^{-1} can be assigned to aromatic C=C structure. The peak at 1375 cm^{-1} can be assigned to the anti-symmetric stretch of the carboxyl group. The bands at 1035 and 1018 cm^{-1} can be attributed to C-O stretch of alcohols and carbohydrates as well as C-O-C bonding of aromatics.

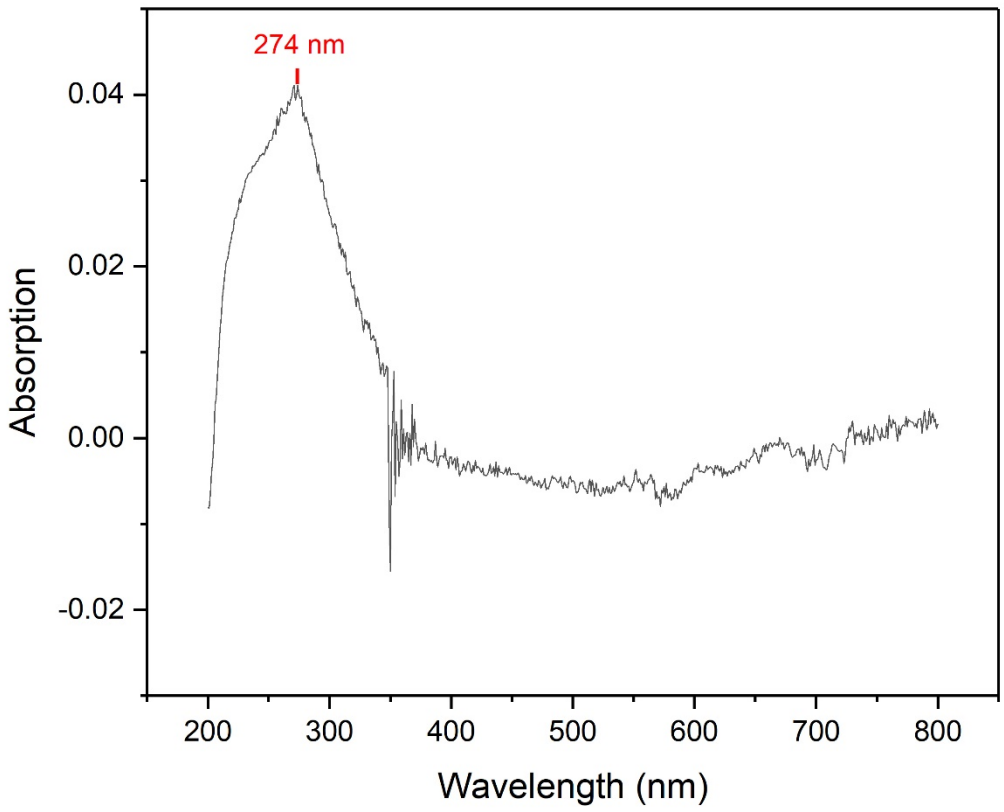

Figure S2. Ultraviolet-Visible (UV-vis) spectrum of HA (1 mg/L in deionized water).

Ultraviolet-Visible (UV-vis) spectroscopy was applied to characterize the HA. As shown in Figure S2, HA shows maximum absorbance at around 274 nm, indicating the presence of aromatics. This is in good agreement with the FTIR spectrum (Figure S1 showing the presence of aromatics in HA) and the information provided by Sigma."