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Enhanced Surfactant Adsorption on Activated Carbon through Manipulation of Surface Oxygen Groups[1] JOHN COLLINS, DEYANG QU, MICHELLE FOSTER, University of Massachusetts, Boston — Passive energy storage is a necessary component for balancing the lifecycle budget with new forms of green energy. The work presented describes how surface oxygen groups (SOG) on granulated activated carbon have been manipulated using Nitric Acid in a controlled, stepwise fashion. The structure and surface functionality of the activated carbon samples were characterized using DRIFTS, Raman Spectroscopy and Porosimetry. Total surface area was found to increase proportionally with the removal of heteroatom material, exposing previously insulated active sites responsible for SOG attachment. Broad oxide peaks were deconvoluted and analyzed, allowing for absolute identification of evolving functionality at each oxidation stage. SOGs were maximized on the third oxidation cycle with the presence of conjugated aromatic, phenol, lactone, and carboxylic acid groups. FSN Zonyl nonionic was applied to all oxidized samples at various concentrations. Total adsorbed surfactant was quantified for each concentration / oxidation scheme using attenuated total reflection. The relative quantity and polarity of chemisorbed surfactant were qualitatively assessed for each equilibrium concentration.

[1]Raman data courtesy of Thermo Fisher Scientific

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