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**Performance of Carbon Hydrogen Storage Materials as a Function of Post-Production Thermal Treatment**[1] E. DOHNKE, J. ROMANOS, M. BECKNER, J.W. BURRESS, P. YU, P. PFEIFER, University of Missouri — High-surface-area activated carbons for hydrogen storage were investigated as a function of post-synthesis surface treatment. Thermal treatment of the initial carbon in high vacuum at temperatures 200-1000 $^{\circ}$C leads to materials with significantly different surface chemistries and hydrogen storage capacities. Results from nitrogen pore-structure analyses, FT-IR spectroscopy before and after the treatment, and thermogravimetric analysis and mass spectroscopy of volatile reaction products during treatment, are reported. For treatment at 600 $^{\circ}$C, excess hydrogen adsorption at 80 K and 303 K is found to be 20-30% higher than for the untreated sample. At temperatures below 450 $^{\circ}$C, volatiles are mostly water and air; volatiles above 450 $^{\circ}$C are mostly carbon dioxide and carbon monoxide. The results are interpreted as that high-temperature treatment produces materials with a large fraction of high-binding-energy sites.

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[X] Prefer Oral Session
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