Public Abstract

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Title:ROOM TEMPERATURE METHANE AND HYDROGEN ADSORPTION STUDIES ON HIGH-SURFACE-AREA NANOPOROUS CARBON MONOLITHS

Monolith fabrication can increase methane/hydrogen volumetric storage capacity by increasing the density of the powder. The resulted monolith is a robust and efficient space-filling form for an adsorbed natural gas vehicle storage tank. To optimize monolith methane/hydrogen storage capacity, we studied four parameters involved in the monolith fabrication process: (I) precursor carbon activated with different KOH mass ratios, (II) binder/carbon mass ratio, (III) monolith compaction temperature and (IV) monolith compaction pressure. We found that precursor with different KOH mass ratio and compaction temperature both have large influences on monolith storage capacities. We have been able to optimize the monolith's methane storage capacity by controlling these parameters in our designed formula for the monolith fabrication process. By applying the designed formula, the ALL-CRAFT carbons show the best gas storage performance among all exiting carbon samples. We determine the adsorbed gas film properties using the Ono-Kondo model and the linear extrapolation method.