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Making alternative fuel vehicles work: Storage through absorption on Missouri corn cob

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The USA's current demand for petroleum leads to many problems (many being global concerns as well): a dependence on foreign nations for our energy, an increase in pollution/global warming, and high gas prices. Each of those is the source of many more problems that will become worse if not addressed: Foreign dependence results in oil-effected politics and economic foreign dependence. Pollution and global warming result in an increase in the destruction of natural habitats due to changing climates, skin damage/cancer due to sun exposure, and natural disasters such as hurricanes and tornadoes that depend on higher temperatures. Along with gas prices increasing, so will the prices of goods and services as the cost of energy to produce them increases. My research with the Alliance for Collaborative Research in Alternative Fuel Technology addresses these issues by overcoming many of the hurdles that make current alternative fuels impractical. We have produced porous activated carbons that store high capacities of methane (natural gas) through physisorption for use in vehicle tanks. In optimizing storage capacity, we have studied production methods that vary the pore size distributions, surface areas, and densities of our carbons. We have found that the optimal pore size for methane is 1.1 nanometers and that it is best to maximize surface area and density. Our current best performers store 115-119 grams of methane per liter of carbon at ambient temperature and 34 bar, compared to the DOE target of 118 g/L. Our research is now expanding to include hydrogen storage.