



2006-05-22 Missouri Researchers Test New Natural Gas Storage Medium

Peter Pfeifer wants to turn corncobs into the natural gas fuel tank of the future, reports The St. Louis Post-Dispatch. Pfeifer, a physicist at the University of Missouri at Columbia, bakes the cobs into a charred carbon that can hold 163 times its own volume of natural gas, much like a sponge holds water. "If this pans out, it could be revolutionary," said Sam Sweargin, the fleet manager for the city of Kansas City's 218 natural gas vehicles. "It could change the face of natural gas vehicles." Early next month, engineers in Kansas City will test the carbon tank in a natural gas-powered pickup. If it works, it may show automakers a way past the alternative fuel's biggest problem: storing enough fuel to achieve vehicle range equivalent to gasoline vehicles. It takes 123 cubic feet of natural gas to match the energy of one gallon of gasoline. That's where Pfeifer's work comes in. To explain why his carbons are so special, he pulls out a piece of cauliflower. The vegetable buds repeat a whorling pattern. "No matter how zoomed in or out you are, you still see the same pattern," he said. The patterns are called fractals. Ferns and clouds and lungs are also fractals. Four years ago, Pfeifer discovered that the labyrinth of pore spaces in carbons was fractal. The fractal nature of the interconnected tunnels makes Pfeifer's carbons good at trapping gas and letting it flow in and out. In a pressurized tank, molecules of natural gas still take up a lot of room. But the narrow tunnels in Pfeifer's carbons are over one nanometer wide, just the right size to pack in two natural gas molecules side by side. And he only needs low pressures of 500 pounds per square inch to infuse the carbon with natural gas. At lower pressures, Pfeifer isn't limited to cigar-shaped tanks. He envisions thin-walled tanks that could conform to unused spaces - for example, the space under a pickup's flatbed could be used just as airplanes use hollow wings to store jet fuel. Low pressures also mean cheaper pumps, because they can rely on cheaper hoses and gaskets and compressors. Phil Buckley, an engineer on the project at the Midwest Research Institute in Kansas City, hopes the atmosphere for alternative fuel research is more receptive than in the past. Parag Shah, an MU graduate student in chemical engineering, has tinkered with the carbon recipe, which starts with ground-up corncobs, with granular nuggets passing through a series of chemical baths and stints in the oven. Using a hydraulic press to pack charred bits into hockey pucks an inch thick, Shah and colleague Demetrius Taylor will deliver 280 of the carbon pucks for testing. Pfeifer hopes the test will help him land a grant from the U.S. Department of Energy this summer. His current funding, from the National Science Foundation, will be exhausted soon. -

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