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Fuel system design for an adsorbed natural gas vehicle

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With energy and environmental concerns mounting as the global energy demand increases, alternative fuels are drawing more and more attention. Natural gas is one such alternative fuel. However, the major shortcoming of natural gas is that it must be highly compressed in order to store at a comparable energy density to liquid fuels. For this reason, The Alliance for Collaborative Research in Alternative Fuel Technology (ALL-CRAFT) aims to develop low-pressure, high-capacity storage technologies for natural gas (methane).

Midwest Research Institute (MRI), an ALL-CRAFT partner, is assigned the task of developing a fuel tank and fuel delivery system for a natural gas-powered vehicle modified to store natural gas using adsorbed natural gas (ANG) technology. The design work performed thus far has been creating a preliminary model and solving the logistics of modifying the vehicle's fuel delivery system to accommodate the use of the ANG tank in addition to the pre-existing compressed natural gas (CNG) tank.

The fuel system of a 2005 Honda Civic GX will be modified by installing an ANG fuel tank to serve as an auxiliary tank to the existing higher pressure CNG tank. The vehicle will have additional capabilities while maintaining all of its original functions. One such capability is running either from its CNG or the ANG tank, with emphasis on maximizing mileage from ANG tank use. Moreover, the CNG tank will be equipped to simultaneously fuel the engine and refill the ANG tank upon the latter's depletion. An on-board CPU will be installed to control this modified fuel delivery system and record data such as mileage accrued from each tank.

The MRI involvement in the ALL-CRAFT project is only at the end of the first of two stages towards completion, but this initial research should provide a solid foundation to complete and fabricate the design.

