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An Alternative Application of the Sabatier Process for More Sustainable Transit

This experiment was devised in light of the urgent need of our society to embrace more sustainable ways of life, with special consideration to the matter of carbon dioxide emissions. The Sabatier process, a chemical reaction whereby hydrogen gas and carbon dioxide gas are reacted to form methane gas and water vapor by means of a nickel or ruthenium catalyst, seems a logical fit for this goal. My research aims at determining the feasibility of a mobile Sabatier system, utilizing existent fuel cell technologies. In such a system, the carbon dioxide generated would not become a greenhouse gas because it would instead be cycled back into the system to generate more methane via the Sabatier process. My experimentation seeks to demonstrate both the plausibility of a mobile Sabatier reactor and the plausibility of an engineered vehicle capable of the necessary processes. First, the Sabatier reaction itself was observed and tested. Second, the necessary components of a theoretical model of this type of vehicle were analyzed, in order to determine whether the engineering of such a vehicle is plausible. Ultimately, the weight of the theorized system may prove inhibitive, but the chemistry is feasible for use in public transit systems.