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## **Gasification of biomass in supercritical water to produce fuel gas**

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The goal of this project is to determine the feasibility of a process for the thermochemical conversion of rice straw into fuel gas using supercritical water as a reaction medium. This will simultaneously eliminate a disposal problem and create renewable energy. Rice straw is an abundant, cheap biomass, and using water as a solvent and reactant eliminates expensive drying procedures required to remove water from the biomass. We gasified .20 grams of rice straw in 1.00 gram of water at a temperature of 700oC in a 10 mL batch reactor. Thus far, we have used varied heating times (5, 10, 15 minutes) and compared char formation versus heating time. After performing several trials varying heating times, we used a thermocouple to monitor the time required to heat the reactor to supercritical conditions. Our findings showed that the reactor took about 20 minutes to reach 700o, and that char formation was greatest for the trials only heated for 5 minutes. In all trials, the reactor was surrounded by sand in an oven. Speculating that sand may be undesirably insulating the reactor from heating, we are currently performing a series of experiments to test char formation of a reactor placed on top of the sand. Future experiments to be performed in the batch reactor include use of a catalyst, heating to different temperatures, varying the biomass, and varying ratio of biomass to solvent. We also will be performing experiments with gasification of rice straw in a continuous reactor.