Global Climate Change Workshop Series

High School Science Fair Projects

University of California Riverside

Dept. of Chemical & Environmental Engineering

UCR | College of Engineering- Center for Environmental Research & Technology

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Alternative Fuels :

Research – Sustainable Energy Systems

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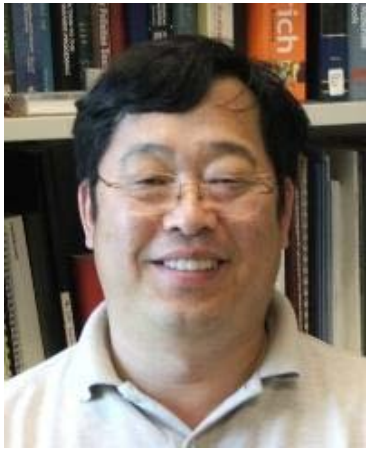

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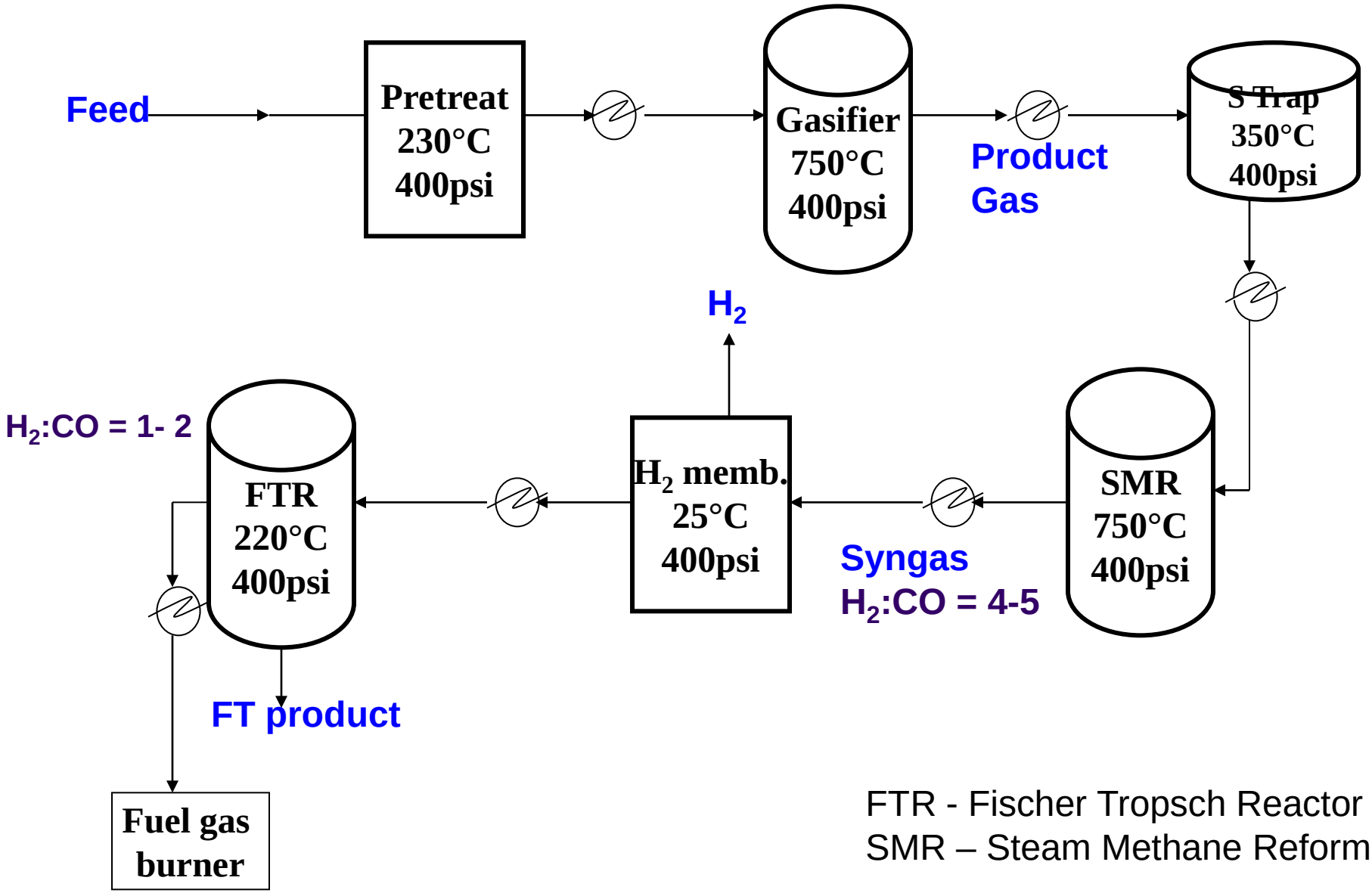
Overall Feed-to-Fuel Process



FTR - Fischer Tropsch Reactor
SMR – Steam Methane Reformer

Candidate Feedstocks

- Biomass organic
  - Vegetable
    - Wood & crop waste
  - Animal
    - Enteric waste, poultry meat, liver & skin, food waste
- Petroleum organic
  - Plastic
  - Polymer
  - Paint residues
- Fossil organic
  - Coal & mine tailings

Products

- Fischer Tropsch (FT) liquids
  - Ultra Clean FT Diesel
    - Clean burning – No sulfur, Low aromaticity
    - High cetane number – long chain paraffins
  - Gasoline
  - Jet Fuel
  - Solvents and waxes

Idea 1

- Can a small community such as a cruise liner or naval aircraft carrier take all of the multiple waste streams and convert it to transport fuel and electricity?
- Study would include how much and the types of waste available. Students to perform an analytical study.

Idea 2

- The hydrogasification process can make diesel fuel.
- Can one make jet fuel?
- What is the process to get jet fuel?
- What is the effect of the syngas on jet fuel quality?

Idea 3

- Determine the conditions to optimize the generation of product gas from hydrogasification of food waste from campus dining services.