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(54) Title: SYSTEMS AND METHODS FOR PROCESSING GASES

(57) Abstract: The invention includes a gas processing system for transforming a hydrocarbon-containing inflow gas into outflow gas products, where the system includes a gas delivery subsystem, a plasma reaction chamber, and a microwave subsystem, with the gas delivery subsystem in fluid communication with the plasma reaction chamber, so that the gas delivery subsystem directs the hydrocarbon-containing inflow gas into the plasma reaction chamber, and the microwave subsystem directs microwave energy into the plasma reaction chamber to energize the hydrocarbon-containing inflow gas, thereby forming a plasma in the plasma reaction chamber, which plasma effects the transformation of a hydrocarbon in the hydrocarbon-containing inflow gas into the outflow gas products, which comprise acetylene and hydrogen. The invention also includes methods for the use of this gas processing system.



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