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(71) **Applicant:** **CHEVRON U.S.A. INC.** [US/US]; 6001 Bollinger Canyon Road, San Ramon, California 94583-0806 (US).

(72) **Inventors:** **SONG, Steven Xuqi**; 6001 Bollinger Canyon Road, San Ramon, California 94583-806 (US). **ZHAN, Bi-Zeng**; 6001 Bollinger Canyon Road, San Ramon, California 94583-0806 (US). **YI, Yaofan**; 6001 Bollinger Canyon Road, San Ramon, California 94583-0806 (US).

(74) **Agent:** **PORTER, Gregory**; Hunton AK LLP, 600 Travis Street, Suite 4200, Houston, Texas 77002 (US).

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(54) **Title:** SYSTEMS AND METHODS FOR PRODUCTION, STORAGE, AND TRANSPORTATION OF HYDROGEN

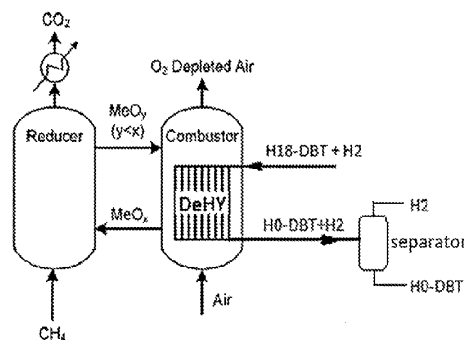


FIGURE 1

(57) **Abstract:** The present disclosure refers to systems and methods for the production, storage, and transportation of hydrogen. In a representative embodiment a reactor system comprises a fluidized bed combustor configured for reduced metal oxide oxidation and heat generation without significant greenhouse gas emission and/or with readily capturable emissions. The reactor system also comprises a liquid organic hydrogen carrier dehydrogenation reactor. The fluidized bed combustor is operatively coupled to the liquid organic hydrogen carrier dehydrogenation reactor. Advantageously, at least a portion of heat generated by the fluidized bed combustor may be transferred to the liquid organic hydrogen carrier dehydrogenation reactor. In this manner hydrogen production and transportation is both energy efficient, low carbon intensity and cost-effective.

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