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(54) **SELECTIVE CO METHANATION CATALYSIS**

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(58) **Field of Classification Search**

USPC 502/327, 355, 415, 439, 332
See application file for complete search history.

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ABSTRACT

Carbon monoxide (CO) is selectively reacted with hydrogen (H₂) over a ruthenium (Ru) on alumina catalyst at a temperature of about 210 to about 290° C. To be a viable option for micro catalytic fuel processing devices, highly active, selective, and stable catalysts must be demonstrated with as large a temperature window for feasible operation as possible. We have studied the effects of metal loading, preparation method, pretreatment conditions, and choice of support on the performance of Ru-based catalysts for such applications. Catalyst testing results and catalyst characterization using XRD and BET are discussed. In one example, operating at a gas hourly space velocity (GHSV) of 13,500 hr⁻¹, a 3% Ru/Al₂O₃ catalyst yielded CO outputs less than 100 ppm in a temperature range from 240° C. to 285° C., while not exceeding a hydrogen consumption of 10%. This catalyst was further successfully demonstrated in a microchannel device.

17 Claims, 10 Drawing Sheets

