INVESTIGATION ON REVERSE WATER-GAS SHIFT OVER La_2NiO_4 CATALYST BY CW-CAVITY ENHANCED ABSORPTION SPECTROSCOPY DURING CH_4/CO_2 REFORMING

B.S. LIU, *Department of Chemistry, Tianjin University, Tianjin 300072, P.R. China and Department of Chemistry, The University of Hong Kong, Pokfulam Road, Hong Kong*; LING LI, A.S.-C. CHEUNG, *Department of Chemistry, The University of Hong Kong, Pokfulam Road, Hong Kong*; C.T. AU, *Department of Chemistry and Center for Surface Analysis and Research, Hong Kong Baptist University, Kowloon Tong, Hong Kong*.

Reverse water-gas shift (RWGS) reaction over La_2NiO_4 catalyst was investigated during CH_4/CO_2 reforming by continuous wave (cw) cavity enhanced absorption spectroscopy (CEAS), a sensitive absorption technique. A cw-diode laser with wavelength in the 1.3 μm region and an optical cavity consists of a pair of high reflectivity mirrors (0.99995) were used in the experiment. Absorption lines of the $\Delta J = 0$ (Q branch) rotational transitions of the $2_0^1 3_0^1$ vibrational transition of CH_4 near 7510 cm^{-1}, and the $J = 5, K_a = 0, K_c = 5$ to $J = 6, K_a = 2, K_c = 4$ rotational transition of the $1_0^1 3_0^1$ vibrational transition of H_2O near 7511.29 cm^{-1} were monitored. The results indicated that the RWGS reaction promoted the conversion of CO_2 and decreased the partial pressure of hydrogen. Our CEAS result confirms that the conversion of CO_2 is always 3-5% higher than CH_4 due to RWGS reaction. In addition, the effect of reaction temperature on RWGS was studied.

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