

## INVESTIGATION ON REVERSE WATER-GAS SHIFT OVER $\text{La}_2\text{NiO}_4$ CATALYST BY CW-CAVITY ENHANCED ABSORPTION SPECTROSCOPY DURING $\text{CH}_4/\text{CO}_2$ REFORMING

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Reverse water-gas shift (RWGS) reaction over  $\text{La}_2\text{NiO}_4$  catalyst was investigated during  $\text{CH}_4/\text{CO}_2$  reforming by continuous wave (cw) cavity enhanced absorption spectroscopy (CEAS), a sensitive absorption technique. A cw-diode laser with wavelength in the  $1.3 \mu\text{m}$  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  $\text{CH}_4$  near  $7510 \text{ cm}^{-1}$ , 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  $\text{H}_2\text{O}$  near  $7511.29 \text{ cm}^{-1}$  were monitored. The results indicated that the RWGS reaction promoted the conversion of  $\text{CO}_2$  and decreased the partial pressure of hydrogen. Our CEAS result confirms that the conversion of  $\text{CO}_2$  is always 3-5% higher than  $\text{CH}_4$  due to RWGS reaction. In addition, the effect of reaction temperature on RWGS was studied.

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