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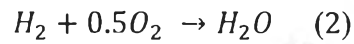
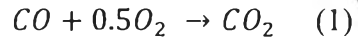
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## APPENDIX

### Calculation for Catalytic Activity

PROX reaction:



**Table 1** The feed input and output of 1 wt% Au/ Ce<sub>0.75</sub>Zr<sub>0.25</sub>O<sub>2</sub> at 50 °C

Reactant	Input	Output
CO	11823.79	704.62
O <sub>2</sub>	12922.75	610.36

Equation for CO conversion:

$$\begin{aligned} \text{CO conversion (\%)} &= \frac{[CO]_{in} - [CO]_{out}}{[CO]_i} \times 100 \\ &= \frac{11823.79 - 704.62}{11823.79} \times 100 \\ &= 94.04 \% \end{aligned}$$

Equation for selectivity:

$$\begin{aligned} \text{Selectivity (\%)} &= \frac{[O_2]_{CO}}{[O_2]_{CO} + [O_2]_{H_2}} \times 100 \\ &= \frac{0.5 \times ([CO]_{in} - [CO]_{out})}{[O_2]_{in} - [O_2]_{out}} \times 100 \\ &= \frac{0.5 \times (11823.79 - 704.62)}{12922.79 - 610.36} \times 100 \\ &= 49.35 \% \end{aligned}$$

where:

$[\text{CO}]_{\text{in}}$  = concentration of CO in the reactant gas,

$[\text{CO}]_{\text{out}}$  = concentration of CO in the effluent gas,

$[\text{O}_2]_{\text{in}}$  = concentration of  $\text{O}_2$  in the reactant gas,

$[\text{O}_2]_{\text{out}}$  = concentration of  $\text{O}_2$  in the effluent gas,

$[\text{O}_2]_{\text{CO}}$  = amount of  $\text{O}_2$  for CO oxidation, and

$[\text{O}_2]_{\text{H}_2}$  = amount of  $\text{O}_2$  for  $\text{H}_2$  oxidation.

## CURRICULUM VITAE

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