Supplementary Materials

Syngas Production via Oxidative Reforming of Propane Using a CO2- and O2-Permeating Membrane

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Based on the chromatography analysis, the conversion rate of C_3H_8, CO_2, and O_2 can be estimated by Eqs. (S1), (S2) and (S3).

$$X_{C_3H_8} = \frac{F_{C_3H_8(in)} - F_{C_3H_8(out)}}{F_{C_3H_8(in)}} \times (100) \qquad (S1)$$

$$X_{CO_2} = \frac{J_{CO_2} - J_{CO_2\,(unconsumed)}}{J_{CO_2}} \times (100) \qquad (S2)$$

$$X_{O_2} = \frac{J_{O_2} - J_{O_2\,(unconsumed)}}{J_{O_2}} \times (100) \qquad (S3)$$

In Eq. (S1), $F_{C_3H_8\,(in)}$ and $F_{C_3H_8\,(out)}$ are the propane flow rate at the sweep in and the sweep out of the membrane reactor, while in Eq. (S2) and (S3) J_{CO_2}, J_{O_2} correspond to the permeated concentration of species through the membrane and J_{CO_2}, $J_{O_2\,(unconsumed)}$ represent the unreacted flux of CO_2 and O_2.