Supplementary Material (ESI) for Chemical Communications

Supporting Information

Selective and stable iso-butene production over highly dispersed VO_x species on SiO_2 supports via combining oxidative and non-oxidative iso-butane dehydrogenation

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Calculation of conversion, selectivity and yield

$$X_{iso-C_4H_{10}} = \frac{\dot{n}^{0}_{iso-C_4H_{10}} - \dot{n}_{iso-C_4H_{10}}}{\dot{n}^{0}_{iso-C_4H_{10}}} \times 100\% \quad (1)$$

$$Y_{iso-C_4H_8} = \frac{\dot{n}_{iso-C_4H_8}}{\dot{n}^{0}_{iso-C_4H_{10}}} \times 100\% \quad (2)$$

$$S_{iso-C_4H_8} = \frac{\dot{n}_{iso-C_4H_8}}{\dot{n}^{0}_{iso-C_4H_{10}} - \dot{n}_{iso-C_4H_{10}}} \times 100\% \quad (3)$$

$$S_{CO_x} = \frac{\dot{n}_{COx}}{\dot{n}^{0}_{iso-C_4H_{10}} - \dot{n}_{iso-C_4H_{10}}} \times 100\% \quad (4)$$

where $\dot{n}^{0}_{iso-C_4H_{10}}$ is molar flux of iso-butane at the reactor inlet, while $\dot{n}_{iso-C_4H_{10}}$, $\dot{n}_{iso-C_4H_8}$, and $\dot{n}_{COx}$ are molar fluxes of iso-butane, iso-butene, and carbon oxides at the reactor outlet.

It should be stressed that the outlet molar fluxes were normalized by taking into account the reaction-induced volume changes.

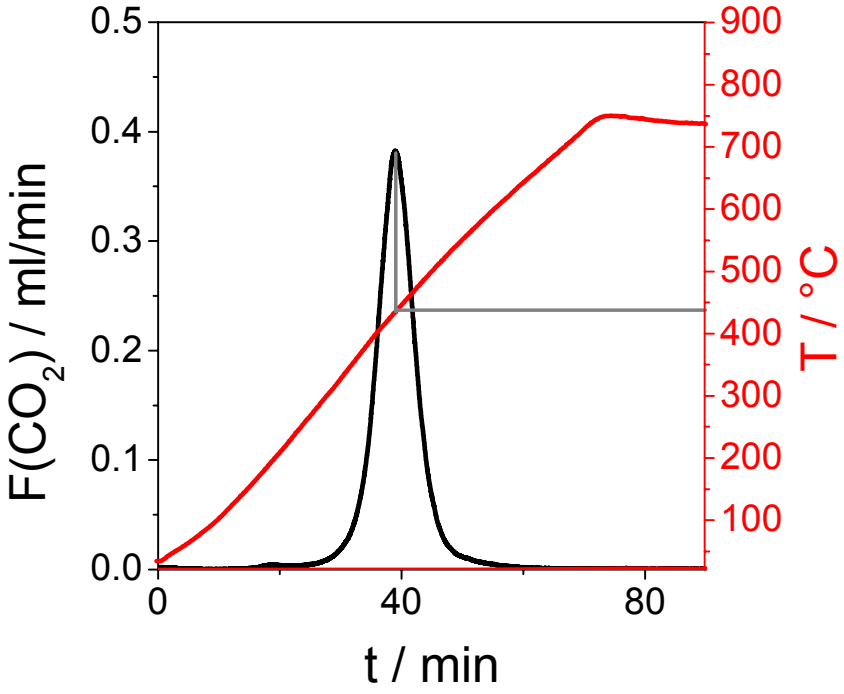

Figure S1 CO_2 formation during temperature-programmed oxidation (5vol.% O_2 in an Ar/Ne=10/85 mixture) of $VO_x(1.3)/SiO_2$ used for 21 hours on stream in iso-butane dehydrogenation (T=833 K, W = 0.6 g of catalyst, Flow = 2.4 ml/min, reaction feed:15 % vol. iso-C_4H_{10}, 1% O_2 in Ne, T=833 K).