Oxidative dehydrogenation of dimethyl ether to 1,2-dimethoxyethane over oxide catalysts

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Catalyst characterization

XRD

The phase composition of the catalysts was examined by X-ray diffraction (XRD) analysis. XRD patterns were recorded using a DRON-2 diffractometer with Ni-filtered Cu Kα radiation (λ = 0.1542 nm) in a step scanning mode, with a step of 0.02º and a counting time of 0.6 s per step in the range of 2θ = 20–80º. Identification of the phases was performed by the comparison of the position and intensity of the peaks with the data from the International Center for Diffraction Data.

TG-DTA

Thermal analysis was performed by the TG-DTA method using a Derivatograph-C instrument (MOM Company). The catalyst sample (18 mg) was placed in a platinum crucible and heated in air from 20 to 700 ºC at a heating rate of 10 ºC/min. Alumina was used as a reference in the DTA measurements.
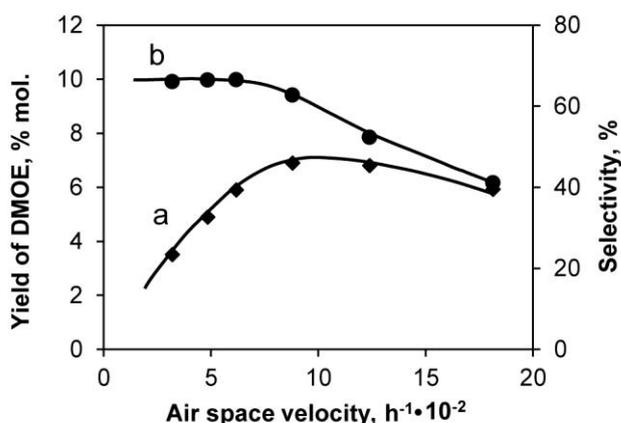

Figure S1 Dependence of the DMOE yield (a) and selectivity (b) on the air space velocity in the reaction over CaO-SnO$_2$. Reaction conditions: catalyst wt., 1 g, 300 ºC, GHSV of DME and He are of 860 and 750 h^{-1}, respectively.
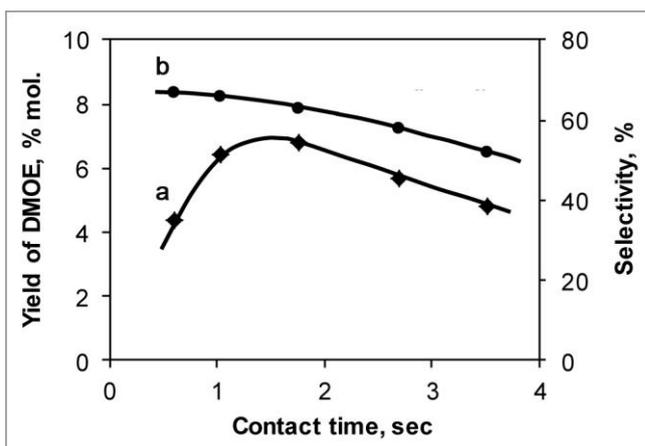
Figure S2 Dependence of the DMOE yield (a) and selectivity to DMOE (b) on the contact time in the reaction over CaO-SnO$_2$. Reaction conditions: catalyst wt., 1 g, 300 ºC, GHSV of air, DME and He were changed in the intervals of 415–3165, 435–3000, 435–1360 h^{-1}, respectively.