Supplementary Information:

Selectively controlled synthesis of diethyl carbonate and methyl ethyl carbonate via transesterification of dimethyl carbonate over KATriz/Al_2O_3 catalyst

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Catalyst characterization

The BET surface areas were conducted by using an American Quantachrome iQ2 automated gas sorption analyzer at 77 K. The pore-size distribution was calculated by Barrett, Joyner, and Halenda (BJH) method from desorption isotherm.

IR-diffuse reflectance spectra (IR) of samples were analyzed by a Bruker VERTEX 70 FTIR spectrometer.

Thermogravimetry curves were scanned under N_2 atmosphere at a heating rate of 10 °C/min from 30 °C to 800 °C on METTLER TG1 system

X-ray diffraction (XRD) was examined on a Siemens D/max-RB powder X-ray diffract meter with Cu Kα radiation (40 mA, 40 kV) and the patterns recorded in the 2 Theta range of 10° to 80°.

X-ray photoelectron spectroscopy (XPS) was performed on VG ESCALAB210 using Al Ka radiation at a pass energy of 20 eV. The electron binding energy was referenced to the C1s peak at 284.8 eV.

The surface base properties of the catalysts were tested by CO_2-TPD equipped with a thermal conductivity detector (TCD). The solid sample (100 mg) was pretreated at 200 °C for 1 h under He (40 mL/min) and then cooled to 30 °C. Then the sample was exposed to CO_2 stream (50 mL/min) 30 °C for 1 h and flushed again with He for 1 h to wipe off any physico-adsorbed CO_2. The desorption profile was recorded at a heating rate of 10 °C min^{-1} from 30 °C to 300 °C and maintained at this temperature until the TCD signal came back to baseline. The basic amounts were expressed as the number of CO_2 molecules per gram of catalyst (μmol CO_2/g).

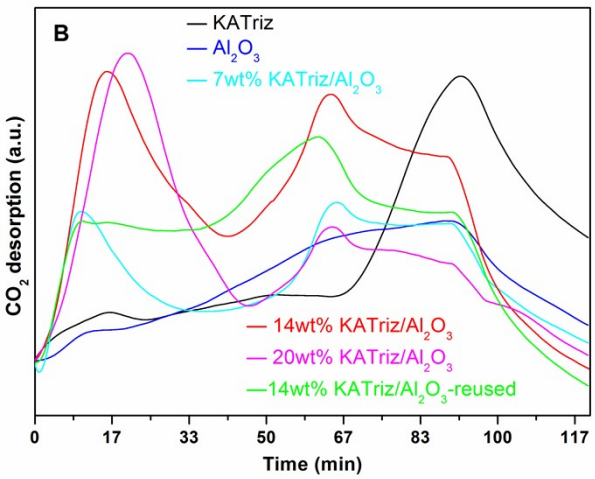

Fig.S1 CO_2-TPD profiles of KATriz, Al_2O_3, and KATriz/Al_2O_3 catalyst

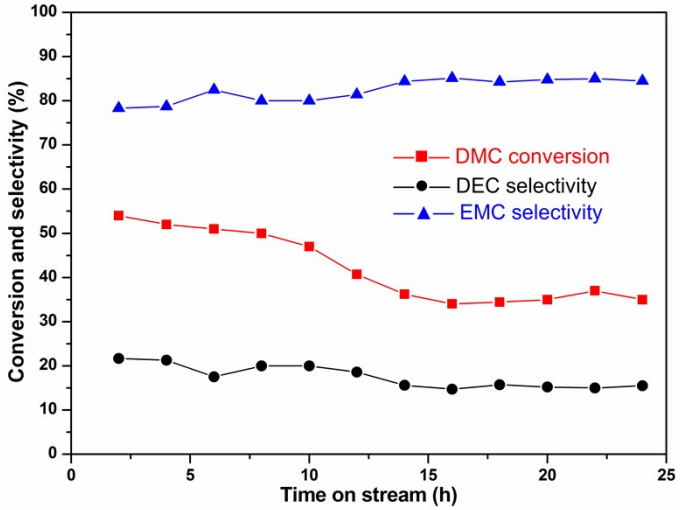

Fig. S2 Stability of the 14wt%KATriz/Al_2O_3 catalyst for the transesterification of DMC and C_2H_5OH. [Reaction conditions: 80 °C, DMC/ethanol =1:2 (molar ratio), and LHSV = 6 h^{-1}]