Supplementary Information:

Effectively synthesis of diethyl carbonate from ethyl carbamate and ethanol using Mg-Y composite oxides

Peixue Wang, ‡a,b,c Shimin Liu, ‡a,b Xinjiang Cui, *a,b,c Yang Wu, a,b,c, Feng Shi* a,b,c

‡ State Key Laboratory for Oxo Synthesis and Selective Oxidation, State Key Laboratory of Solid Lubrication, Lanzhou Institute of Chemical Physics, Lanzhou Institute of Chemical Physics, Chinese Academy of Sciences, Lanzhou, 730000, China. E-mail: fshi@licp.cas.cn; Tel: +86-931-4968142

‡ Shandong Laboratory of Yantai Advanced Materials and Green Manufacturing, Yantai 264006, China

‡ Qingdao Center of Resource Chemistry & New Materials, Qingdao, 266100, China

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‡ Peixue Wang and Shimin Liu are co-first authors.

Fig. S1 The DTG curve of HTMgY precipitation.

Fig. S2 CO2-TPD profiles of MgO, Y2O3, MgY-300, MgY-450, MgY-600. Temperature and signal relationship diagram (the desorption profile was recorded from room temperature to pretreated temperature)
**Fig. S3** $^1$H NMR spectra of the reaction mixture (DCCl$_3$, 400 MHz, 25 °C).

C$_2$H$_5$OH: $\delta = 1.20, 1.22, 1.24$ (3H), $\delta = 3.65, 3.67, 3.69, 3.71$ (2H), $\delta = 4.2$ (1H);
DEC: $\delta = 1.33, 1.31, 1.29$ (6H), $\delta = 4.22, 4.20, 4.18, 4.17$ (4H);
EC: $\delta = 1.27, 1.25$ (3H), $\delta = 4.13, 4.11, 4.09, 4.08$ (2H).

**Fig. S4** $^{13}$C NMR spectra of the reaction mixture (DCCl$_3$, 400 MHz, 25 °C).

C$_2$H$_5$OH: $\delta = 7.82, 18.11$;
DEC: $\delta = 14.14, 63.76, 155.17$;
EC: $\delta = 14.37, 60.95, 157.54$. 
EC, DEC standard curve and GC curve in Table 3

**Fig.S5** The standard curve of EC uses 0.1g biphenyl as the internal standard

**Fig.S6** The standard curve of DEC uses 0.1g biphenyl as the internal standard
Fig. S7 Gas chromatography of DEC synthesis using MgY-450 catalyst, DEC (1.8min), EC (2.1min), NEEC (2.5min), biphenyl (6.6min)

Fig. S8 Gas chromatography of DEC synthesis using MgY-300 catalyst, DEC (1.8min), EC (2.3min), NEEC (2.6min), biphenyl (6.6min)
**Fig. S9** Gas chromatography of DEC synthesis using MgY-600 catalyst, DEC (1.8min), EC (2.3min), NEEC (2.6min), biphenyl (6.6min)

**Fig. S10** Gas chromatography of DEC synthesis without catalyst, DEC (1.8min), EC (2.4min), NEEC (2.5min), biphenyl (6.6min)
**Fig. S11** Gas chromatography of DEC synthesis using MgO catalyst, DEC (1.8min), EC (2.2min), NEEC (2.5min), biphenyl (6.6min)

**Fig. S12** Gas chromatography of DEC synthesis using MgO+Y$_2$O$_3$ catalyst, DEC (1.8min), EC (2.3min), NEEC (2.6min), biphenyl (6.6min)
**Fig.S13** Gas chromatography of DEC synthesis using Y$_2$O$_3$ catalyst, DEC (1.8min), EC (2.3min), NEEC (2.6min), biphenyl (6.6min)

**Fig.S14** Gas chromatography of DEC synthesis using MgY-450$^{1st}$ catalyst, DEC (1.8min), EC (2.3min), NEEC (2.6min), biphenyl (6.6min)
Fig. S15 Gas chromatography of DEC synthesis using MgY-450\textsuperscript{2nd} catalyst, DEC (1.8min), EC (2.2min), NEEC (2.6min), biphenyl (6.6min)

Fig. S16 Gas chromatography of DEC synthesis using MgY-450\textsuperscript{3rd} catalyst, DEC (1.8min), EC (2.2min), NEEC (2.6min), biphenyl (6.6min)