Supporting Information

Inclusion Complexes of Organic Salts with β-Cyclodextrin as Organocatalysts for CO₂ Cycloaddition with Epoxides

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Fig. S1 $^1$H NMR spectra of (a) [DBUH][PhO]; (b) [DBUH][p-NO$_2$-PhO]; (c) [DBUH][p-FPhO]; (d) [DBUH][o-FPhO]; (e) [DBUH][PFPhO].
Fig. S2 $^{13}$C NMR spectra of (a) [DBUH][PhO]; (b) [DBUH][p-FPhO]; (c) [DBUH][o-FPhO]; (d) [DBUH][p-NO$_2$-PhO].
Fig. S3 $^1$H NMR spectra of (a) β-CD; (b) [DBUH][PhO]/β-CD; (c) [DBUH][p-FPhO]/β-CD; (d) [DBUH][o-FPhO]/β-CD; (e) [DBUH][p-NO$_2$PhO]/β-CD; (f) [DBUH][PFPhO]/β-CD.
Fig. S4 $^{13}$C NMR spectra of (a) β-CD; (b) [DBUH][PFPhO]; (c) [DBUH][PFPhO]/β-CD (0.054 mmol/mL in d$_6$-DMSO); (d) [DBUH][PFPhO]/β-CD (0.108 mmol/mL in d$_6$-DMSO); (e) [DBUH][PFPhO]/β-CD (0.134 mmol/mL in d$_6$-DMSO).
Fig. S5 The $^{19}$F NMR spectra (500 MHz) of the [DBUH][PFPhO]/β-CD (a) 0.108 mmol/mL in d$_6$-DMSO; (b) 0.134 mmol/mL in d$_6$-DMSO; (c) 0.108 mmol/mL in d$_6$-DMSO at 70 °C.
Fig. S6 The thermal gravity analysis of (a) β-CD; (b) [DBU][PFPhO]; (c) [DBU][PFPhO]/β-CD.
Fig. S7 The SEM images of β-CD (a, d); [DBUH][PFPhO] (b, c); [DBUH][PFPhO]/β-CD (e, f).
Fig. S8 Relationship of PO remaining with reaction time at different temperature over cayalyst: (a) [DBUH][PFPhO]/β-CD; (b) [DBUH][PFPhO]; and relationship of -Ln(1-Con.) with reaction time at different temperature over cayalyst: (c) [DBUH][PFPhO]/β-CD; (d) [DBUH][PFPhO].
Table S1. The pKa value of phenol and other derivatives

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Table S2. The effect of amount of [DBUH][PFPhO]β-CD on the catalyst activity. a

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a Reaction conditions: PO 0.7 mL (10 mmol), 130 °C, 3 MPa, 10 h; b The amount of catalyst was based on that of [DBUH][PFPhO].
Fig. S9 $^{13}$C NMR spectra of (a) Fresh [DBUH][PFPhO]; (b) [DBUH][PFPhO] after the absorption of CO$_2$; (c) [DBUH][PFPhO] after removing the CO$_2$ by vacuuming.
**Scheme S1** The plausible mechanism of CO$_2$ absorption by [PFPhO]$^\cdot$.