Controllable Synthesis of Narrow Polydispersity CO\textsubscript{2}-Based Oligo(carbonate-ether) tetraol

Shunjie Liu\textsuperscript{a,b}, Yuyang Miao\textsuperscript{a}, Lijun Qiao\textsuperscript{a}, Yusheng Qin\textsuperscript{a,*}, Xianhong Wang\textsuperscript{a,**}, Xuesi Chen\textsuperscript{a}, Fosong Wang\textsuperscript{a}

\textsuperscript{a}Key Laboratory of Polymer Ecomaterials, Changchun Institute of Applied Chemistry, Chinese Academy of Sciences, Changchun 130022, People’s Republic of China.

\textsuperscript{b}University of Chinese Academy of Sciences, Beijing 100049, People’s Republic of China

*Corresponding author at: Key Laboratory of Polymer Ecomaterials, Changchun Institute of Applied Chemistry, Chinese Academy of Sciences, Changchun 130022, People’s Republic of China.

Fax: +86 0431 85262252; Tel: +86 0431 85262252.

**Corresponding author at: Key Laboratory of Polymer Ecomaterials, Changchun Institute of Applied Chemistry, Chinese Academy of Sciences, Changchun 130022, People’s Republic of China.

Fax: +86 0431 85689095; Tel: +86 0431 85262250.

E-mail addresses: ysqin@ciac.ac.cn, xhwang@ciac.ac.cn
Fig. S1. ESI-MS spectrum of the product, copolymerization was carried out at 80 °C and 4 MPa for 5 min (less than 10% conversion), where 0.52 g adipic acid ($n_{\text{COOH}} = 0.007 \text{ mol}$), 20 mg Zn-Co-DMC catalyst and 10 ml PO were added.

Fig. S2. ESI-MS spectrum of the product, the copolymerization was carried out at 80 °C and 4 MPa for 5 min (less than 9% conversion), where 0.42 g succinic acid ($n_{\text{COOH}} = 0.007 \text{ mol}$), 20 mg Zn-Co-DMC and 10 ml PO were added.

Fig. S3. ESI-MS spectrum of the product, the copolymerization was carried out at 80 °C and 4 MPa for 5 min (less than 8% conversion), where 0.37 g malonic acid ($n_{\text{COOH}} = 0.007 \text{ mol}$), 20 mg Zn-Co-DMC and 10 ml PO were added.
Fig. S4. $^1$H NMR spectrum (a) and $^{13}$C NMR spectrum (b) of oligo(carbonate-ether) tetraol from entry 8 Table 1.
Fig. S5. MALDI-TOF-MS spectrum of oligo(carbonate-ether) tetraol (entry 8, Table 1). a: full spectrum, b: mass from 1300 to 1900 g mol⁻¹.