Supporting Information

of

Novel Cationic Poly(ester-co-carbonate) Materials Functionalized with Tertiary Amine groups

Wei Su, Hua-fen Wang, Jun Feng*, Xiao-hua Luo, Xian-zheng Zhang, Ren-xi Zhuo

* Key Laboratory of Biomedical Polymers (The Ministry of Education), Department of Chemistry, Wuhan University, Wuhan, 430072, China. Tel.: + 86 27 6875 4509, fax: + 86 27 6875 4509. *E-mail address:* fengjun@whu.edu.cn (J. Feng)
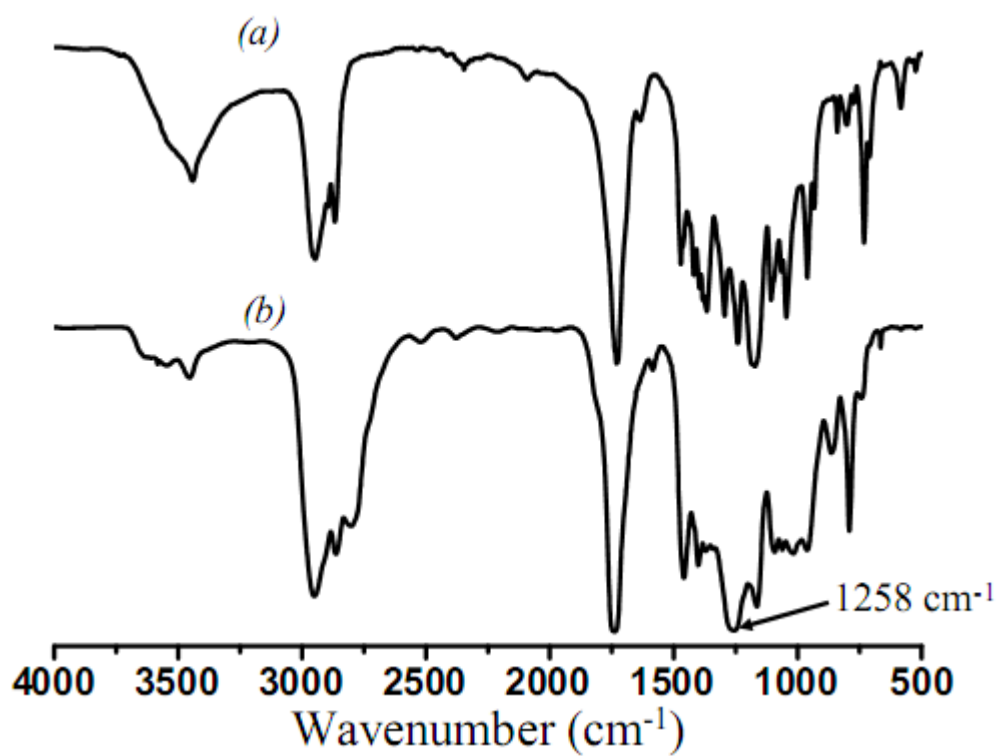
Fig. S1 IR spectra of PCL (a) and poly(ADMC-*co*-CL) (b).

^{1}H NMR analysis for the degradation behavior. To obtain more information about such degradation behaviors, the water-soluble fraction and insoluble residue after enzymatic degradation was collected for ^{1}H NMR analysis, respectively (Figure S2). Poly(ADMC$_{49}$-*co*-CL$_{51}$) with similar content of ADMC and CL units was chosen as the model for this investigation. The ^{1}H NMR spectrum of soluble fraction was shown in Figure S2A. The characteristic resonances from both ADMC and CL units can be clearly detected. We should keep in mind that after PPL-catalyzed degradation, both the weight loss values for Poly(ADMC$_{20}$-*co*-CL$_{80}$) and Poly(ADMC$_{8}$-*co*-CL$_{92}$) samples were much lager than their exact ADMC contents. Obviously, the soluble degraded/detached fractions were not merely composed of hydrophilic PADMC fragments. Furthermore, it can be found in Figure S2A that the relative area integral of signal at δ=4.1 ppm, belonging to methylene groups connected with ester and carbonate groups, was remarkably decreased compared to the raw material. Along with this variation, there occurred a new-emerging signal with strong intensity at δ = 3.62 ppm, ascribed to methylene groups connected with terminal hydroxyl groups of degraded intermediates. Oppositely, nearly no signals were detectable in the same region for raw poly(ADMC$_{49}$-*co*-CL$_{51}$). Meanwhile, the splitting patterns of the characteristic signals around 2.7, 2.3, 1.6 and 1.4 ppm from ADMC and CL units became more complicated than it was before degradation. Those striking difference in ^{1}H NMR spectra before and after degradation suggested that there occurred both the cleavage of carbonate and ester bonds during polymer degradation process.

The insoluble residue exhibited similar spectrum to that prior to degradation

(Figure S2B). It implied, to a certain extent, that the disparity in erosion rate between

PADMC and PCL segments was not as far as anticipated. It is possibly due to that the

presence of hydrophobic PCL interfered with the attack of enzyme/water molecules

towards PADMC segment, whereas enhanced hydrophilicity facilitated the

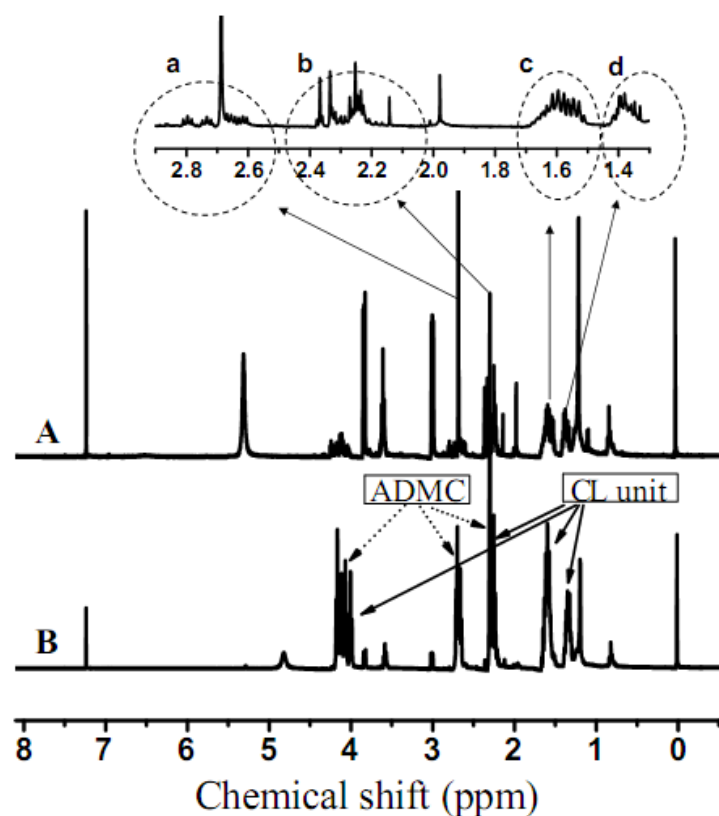contamination and interaction of enzyme/water molecules with PCL segments.

Fig. S2 ^{1}H NMR spectra of the dissolved fragments (a) and insoluble residue (b) of

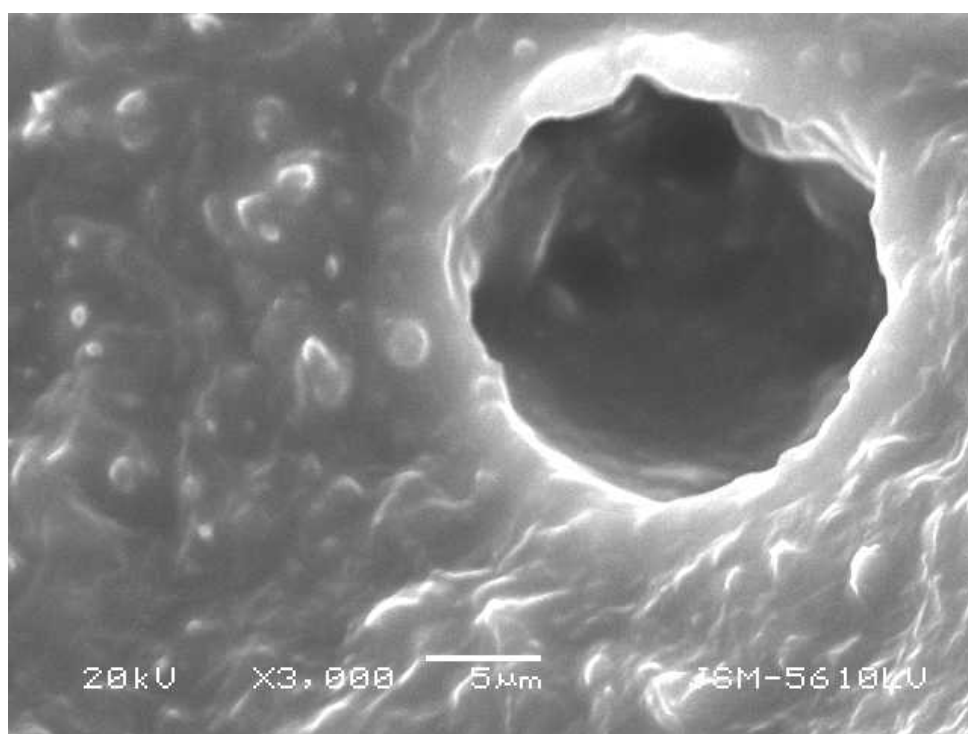Poly(ADMC$_{49}$-co-CL$_{51}$) after 4-day degradation in PPL solution.

Fig. S3 micrograph of Poly(ADMC$_8$-*co*-CL$_{92}$) obtained after enzymatic degradation at a high magnification.