Electronic Supplementary Material (ESI) for Polymer Chemistry.

Preparation of Glucose Responsive Polyelectrolyte Capsules with Shell Crosslinking via Layer-by-Layer Technique and Sustained Release of Insulin

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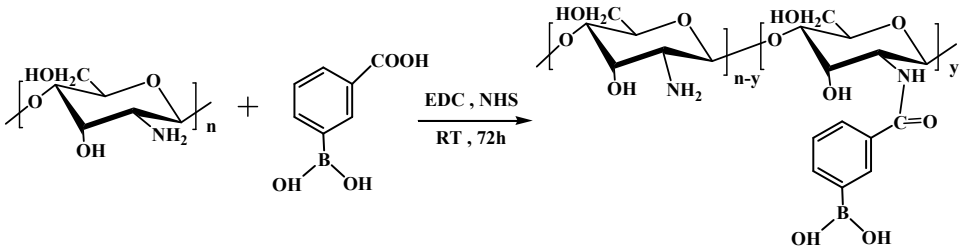

Scheme S1 Schematic representation for Synthesis of CS-*g*-CPBA polymer

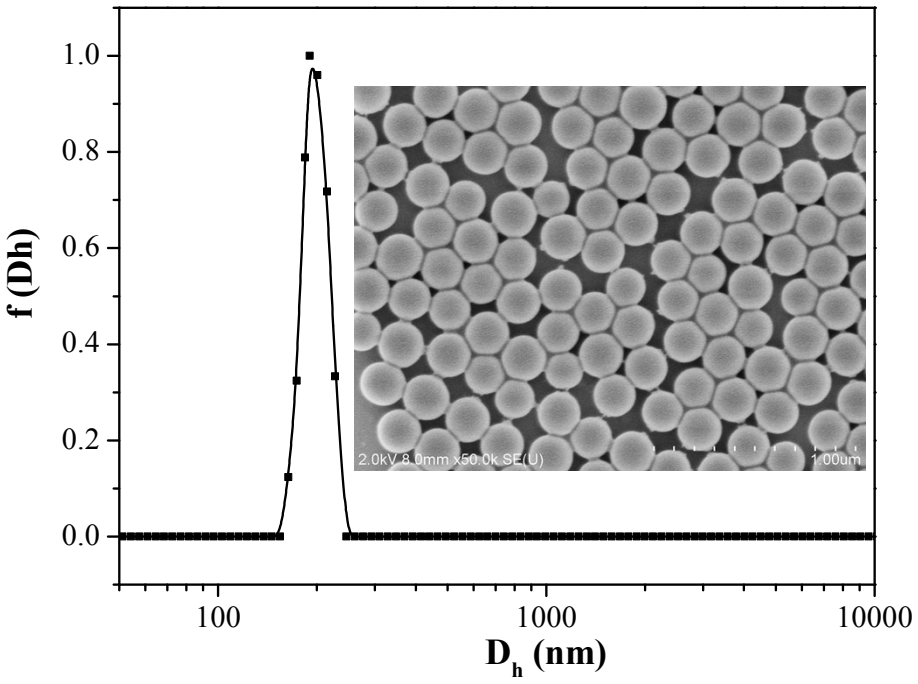

Fig. S1 DLS results and SEM images of SiO_2 nanoparticles

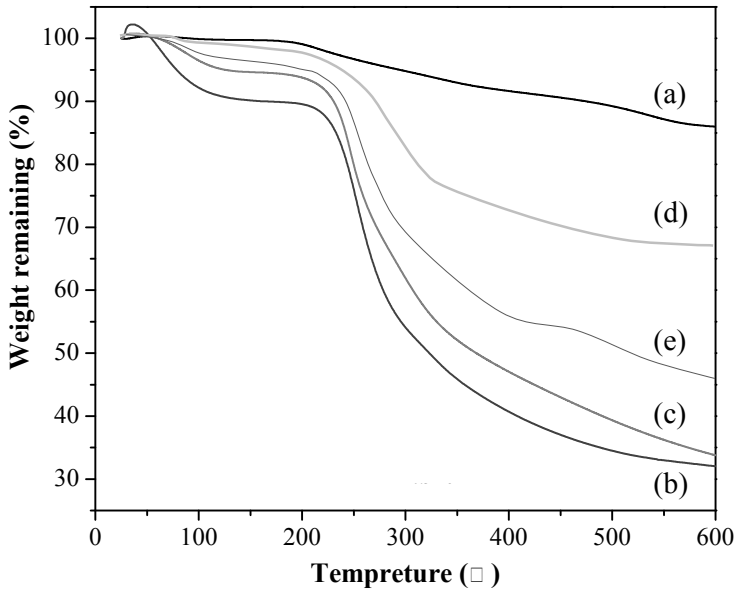

Fig. S2 TGA curves of SiO_2-NH_2 microspheres (a), CS-*g*-$CPBA_{0.31}$ (b) and Alg (c) polymers, $(Alg/CS\text{-}g\text{-}CPBA_{0.31})_5$@$SiO_2$ nanoparticles (d) and $(Alg/CS\text{-}g\text{-}CPBA_{0.31})_5$ capsules after crosslinking (e).

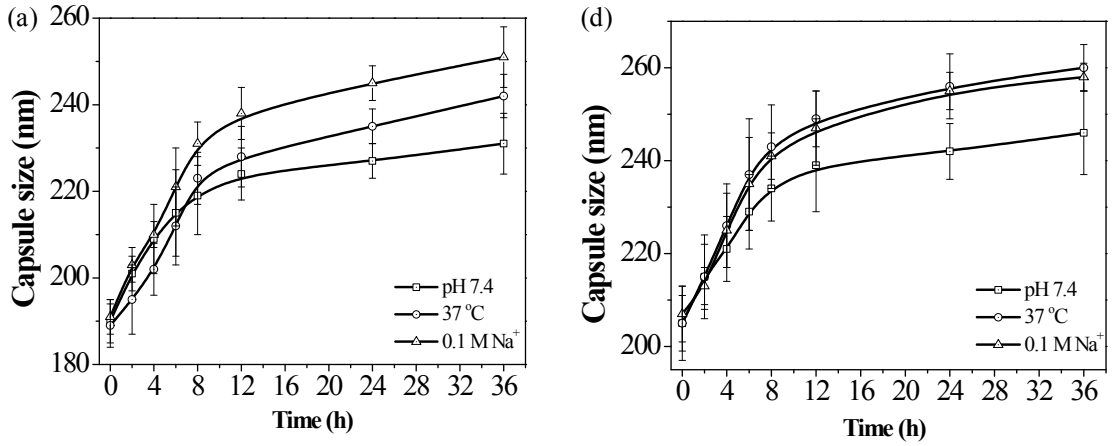

Fig. S3 Size change of $(Alg/CS\text{-}g\text{-}CPBA_{0.31})_9$ capsules without (a) and with 0.5 % Ca^{2+} (b) at the temperature of 37 °C, salt concentration of 0.1M and pH value of 7.4

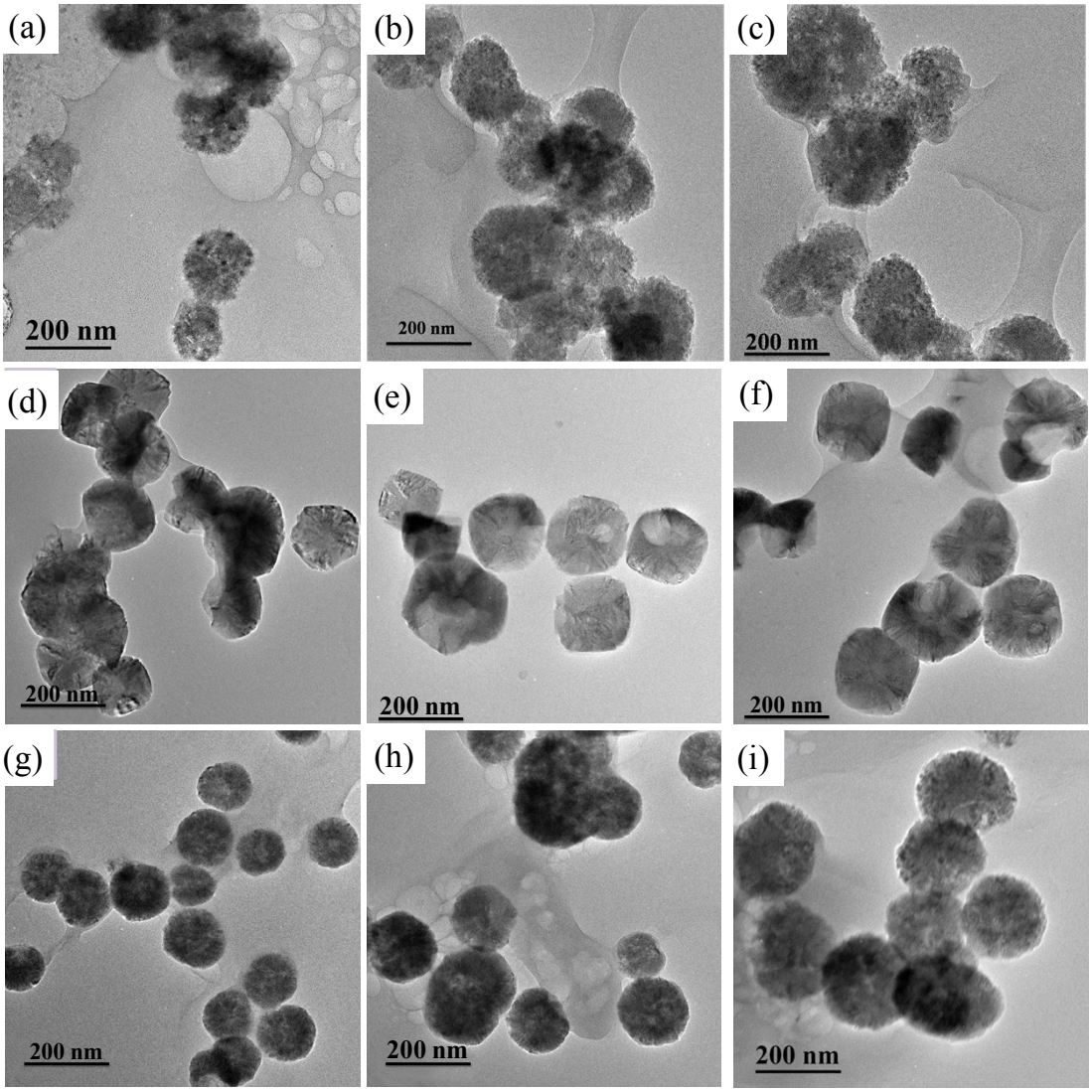

Fig. S4 Morphology changes of $(Alg/CS\text{-}g\text{-}CPBA_{0.31})_9$ capsules without Ca^{2+} (a-c), with 0.5 (d-f) and 1.0 % Ca^{2+} (g-i) after treatment of 20 mg/mL of glucose for 4 h (a, d, g), 8 h (b, e, h) and 12 h (c, f, i).

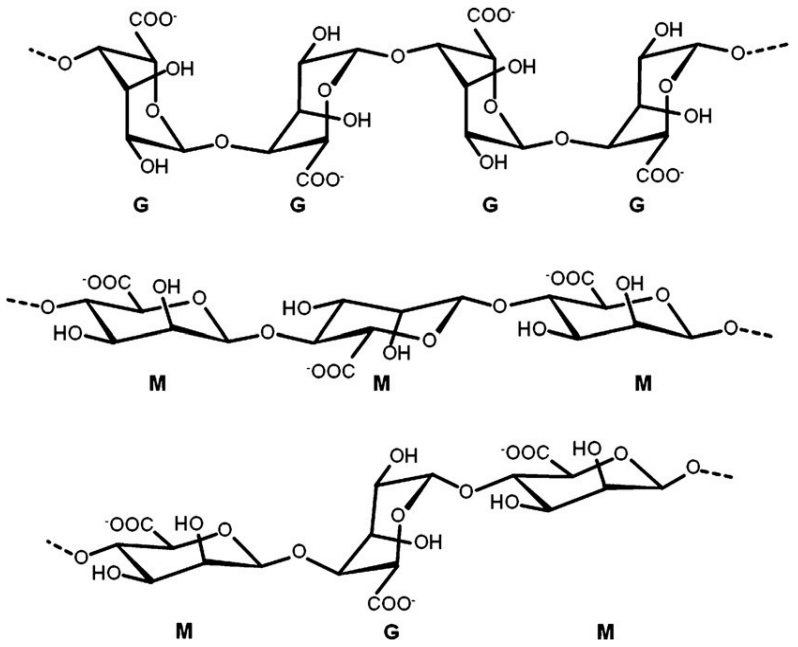

Fig. S5 Chemical structures of GG, MM, and GM block in alginate

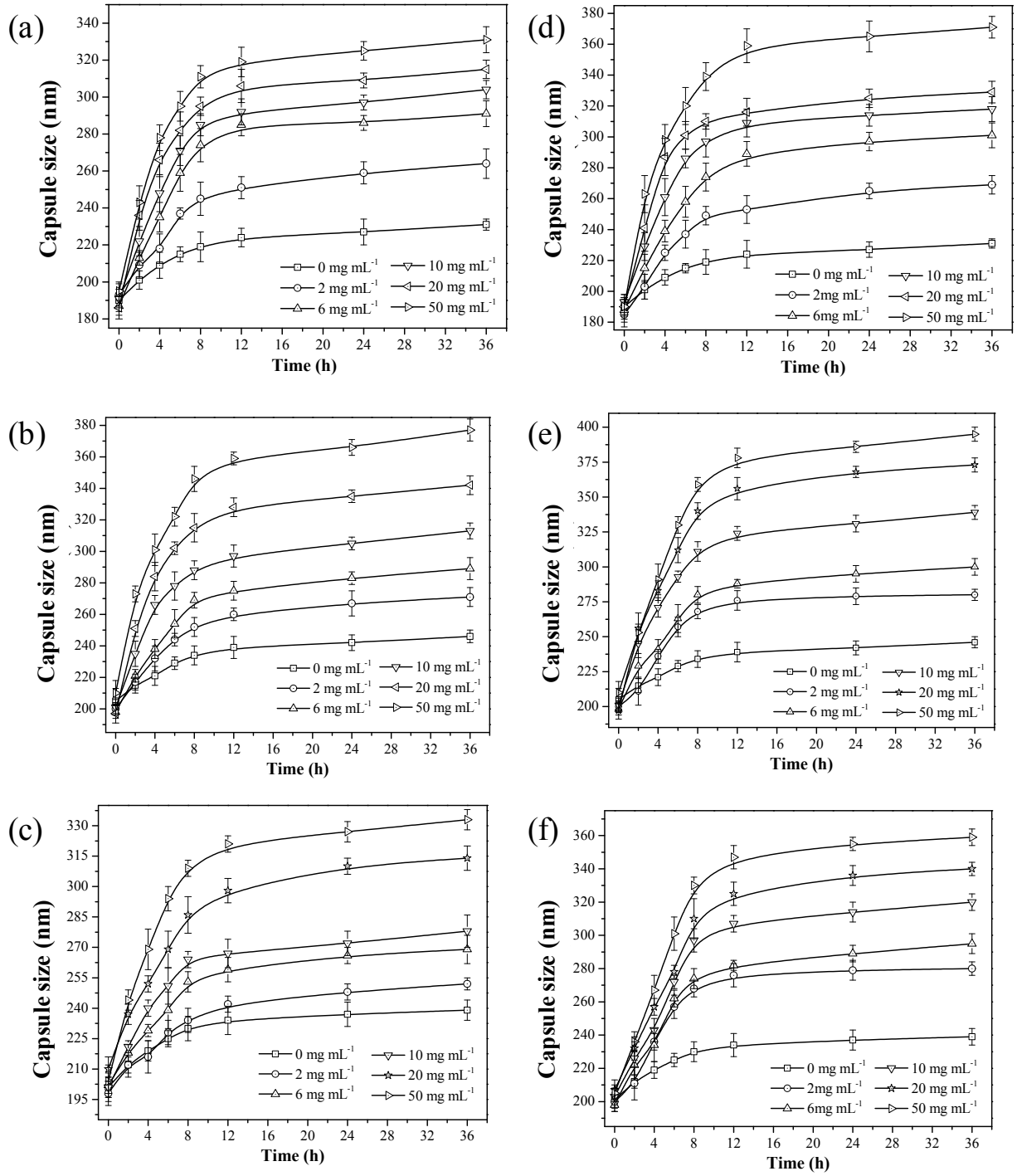

Fig. S6 Effects of glucose concentration on diameters of (Alg/CS-*g*-$CPBA_{0.09}$)$_9$ (a-c), (Alg/CS-*g*- $CPBA_{0.16}$)$_9$ (d-f) capsules without Ca^{2+} (a and d) and with 0.5% (b and e) and 1 % (c and f) of Ca^{2+}

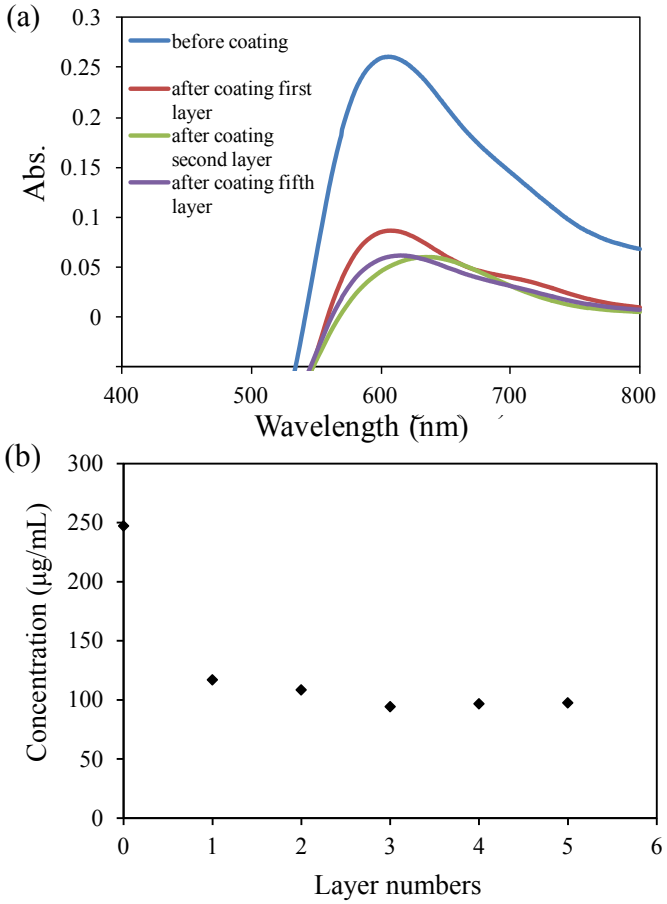

Fig. S7 (a) UV-vis spectra of the $(Alg/CS\text{-}g\text{-}CPBA_{0.31})_n@SiO_2$ nanoparticles with different layer numbers. (b) the changes of the insulin concentration with different layer numbers

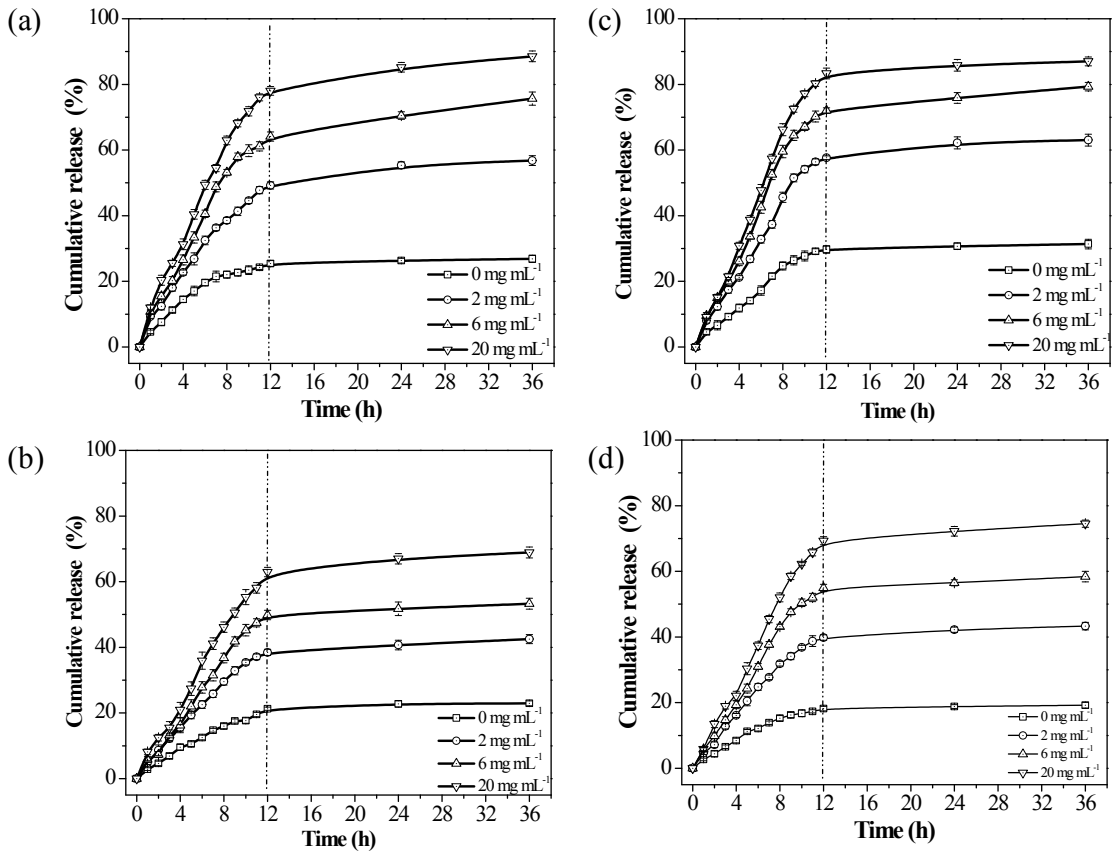

Fig. S8 Glucose-responsive release of insulin by $(Alg/CS\text{-}g\text{-}CPBA_{0.09})_9$ (a-b) and $(Alg/CS\text{-}g\text{-}CPBA_{0.16})_9$ (c-d) capsules without (a and c) and with (b and d) 0.5 % Ca^{2+}

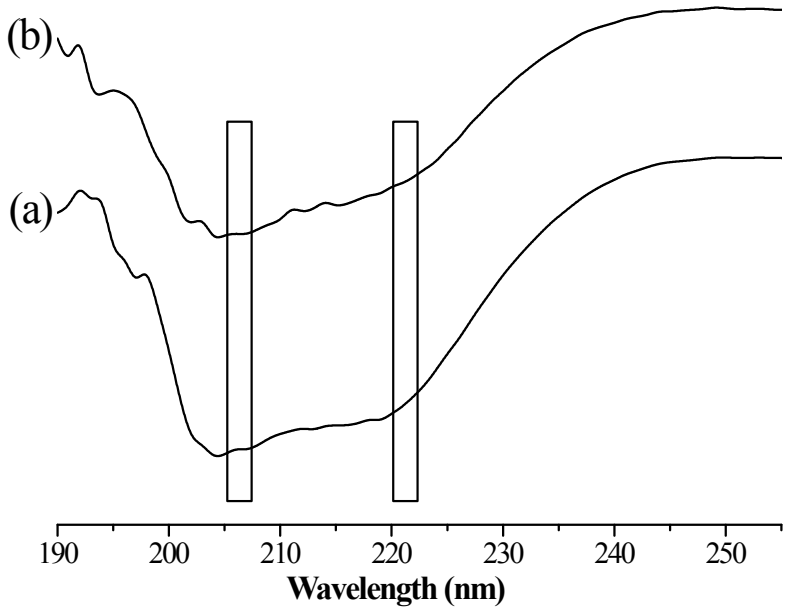

Fig. S9 CD spectra of native insulin (a) and insulin released from complexes (b)