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-g-CPBA$_{0.31}$)$_5$@SiO$_2$ nanoparticles (d) and (Alg/CS-g-CPBA$_{0.31}$)$_5$ capsules after crosslinking (e).

Fig. S3 Size change of (Alg/CS-g-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-g-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<sub>0.09</sub>)<sub>9</sub> (a-c), (Alg/CS-g-CPBA<sub>0.16</sub>)<sub>9</sub> (d-f) capsules without Ca<sup>2+</sup> (a and d) and with 0.5% (b and e) and 1% (c and f) of Ca<sup>2+</sup>
**Fig. S7** (a) UV-vis spectra of the (Alg/CS-g-CPBA\textsubscript{0.31})\textsubscript{n}@SiO\textsubscript{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-g-CPBA$_{0.09}$)$_9$ (a-b) and (Alg/CS-g-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)