Electrochemical deposition to construct nature inspired multilayer chitosan/layered double hydroxides hybrid gel for stimuli responsive release of protein

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Figure S1. SEM images of NO$_3$-LDHs (A) and CO$_3$-LDHs (B).

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Figure S2. SEM images of chitosan/INS-LDHs hydrogels with mass ratios of:
(A) 3:1; (B) 3:4; (C) 3:5; (D) 1:2.
Figure S3. Cumulative release profiles of insulin from chitosan/INS-LDHs hydrogel in 0.9% NaCl solution. The release was performed under different pHs (4.0, 7.0, 9.0) with 0 V voltage applied.
The preparation of NO$_3$-LDHs and CO$_3$-LDHs:

NO$_3$-LDHs was prepared according to a published literature with minor modification.$^1$ Mg(NO$_3$)$_2$·6H$_2$O (15.39g), Al(NO$_3$)$_3$·9H$_2$O (11.26g) and NaNO$_3$ (4.25g) were added and dissolved in 280 ml water under N$_2$ atmosphere. Then diluted ammonia water (6 wt %) was added to the solution at a speed of 25 ml/min till the final pH 9.5. The precipitate was aged for 1.5 h at room temperature and then washed with deionized water. After that, the filter cake was peptized at a constant temperature of 80 °C, formed the positive sol, and dried at 65 °C to get NO$_3$-LDHs.

CO$_3$-LDHs was prepared according to a published literature.$^2$ Mg(NO$_3$)$_2$·6H$_2$O (19.2g) and Al(NO$_3$)$_3$·9H$_2$O (9.38g) was dissolved in water and this solution was added drop-wise to a basic solution (100 ml) containing 0.05 mol Na$_2$CO$_3$. The pH value of the basic solution was kept constant at 11 by adding NaOH solution (3.4 M). The resulting mixture was aged at room temperature for 24 h with continuous stirring. The aged mixture was filtered and washed with deionized water until pH = 7, followed by drying at 100 °C in an oven.

References: