Supporting Information:

Physiochemical properties and bioapplication of nano- and microsized hydroxy zinc phosphate particles modulated by reaction temperature

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Fig. S1. The standard curve of the UV-Vis absorbance of EPI in water, PBS solution with pH value of 6.0 and 7.4.
**Fig. S2.** The morphological and vibertional characteristics of hydroxyapatite (HA). (a) SEM investigation; (b) TEM investigation; (c) FTIR spectrum; (d) Raman spectrum.
Hydroxyapatite fabrication:

To synthesize pure hydroxyapatite, 75 mL Ca(NO$_3$)$_2$ (33.4 mM) and 0.4 mL ammonia (25-28%) solution were added into a 250 mL flask. 1,1,1-Tris(hydroxyl methyl) ethane was used as surfactant additive and added with 1 wt% into the flask before the experiment. The reaction temperature was controlled at 90 °C and the mixture was stirred magnetically for a few minutes until 1,1,1-tris(hydroxyl methyl) was fully dissolved. Then 50 mL (NH$_4$)$_2$HPO$_4$ (20 mM) solution was slowly added dropwise to this solution, with continuous stirring. The solution was stirred at 90 °C for a further 24 h, and then allowed to stand overnight, after which the product was collected by centrifugation and ultrasonic washing with ultrapure water to neutral, and followed by lyophilisation.

**Fig. S3.** The selected-area electron diffraction (SAED) pattern of HZnPPs synthesized at (a) 20, (b) 35 and (c) 65 °C, respectively.

**Fig. S4.** XRD patterns of the HZnPPs (synthesized at 0, 20, 35, 50, 65, 80 and 95 °C) after calcination at 600 °C for 1 h. All peaks of the samples after heat treatment match well with that of Zn$_3$(PO$_4$)$_2$ (PDF: 29-1390)
**Fig. S5.** The SEM investigation of the size and morphology of HZnPPs synthesized at (a) 50 and (b) 80 °C, respectively.

**Fig. S6.** The TEM investigation of the size and morphology of HZnPPs synthesized at (a) 0, (b) 50, (c) 80 and (d) 95 °C
**Fig. S7.** The TEM observation and XRD pattern of HZnPPs synthesized at 20 °C without TME. It shows that the HZnPPs synthesized at 20 °C in the absence of TME also have the same hollow structure and XRD pattern as the previous samples. The XRD analysis result indicates that TME does not affect the crystallinity of the material.

**Fig. S8.** The obtained materials without ammonia added in the synthesis process. (a) The TEM investigation; (b) The XRD analysis.

The material obtained by wet-chemical precipitation of Zn(NO$_3$)$_2$·6H$_2$O and (NH$_4$)$_2$HPO$_4$ without ammonia added (neutral). The reaction temperature was controlled at 20 °C. The material was analyzed with TEM and XRD investigation. The particles obtained are micro-scale in size and rectangle plate in shape. The particle morphology is completely different from the hollow zinc hydroxyl apatite. Furthermore, the XRD analysis shows it is well matched with Zn$_3$(PO$_4$)$_2$·4H$_2$O (PDF: 37-0465).
Fig. S9. The detailed FTIR spectra of the seven HZnPPs samples synthesized at 0–95 °C. All the absorbance peaks are illustrated in the picture one by one.
Fig. S10. The detailed Raman spectra of the seven HZnPPs samples synthesized at 0–95 °C. All the absorbance peaks are illustrated in the picture one by one.
**Fig. S11.** The TEM observation and corresponding with EDS analysis of (a) Cu$^{2+}$-adsorbed HZnPPs synthesized at 95 °C; (b) Pb$^{2+}$-adsorbed HZnPPs synthesized at 95 °C; (c) Cu$^{2+}$-adsorbed HZnPPs synthesized at 20 °C; (d) Pb$^{2+}$-adsorbed HZnPPs synthesized at 20 °C.

**Fig. S12.** Drug loading content (DLC) of EPI by the HZnPPs synthesized at 0 and 20 °C.