

Electronic Supplementary Material (ESI) for RSC Advances.
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SUPPLEMENTARY INFORMATION

**A Postsynthetic Ion Exchange Method for Tunable Doping of
Hydroxyapatite Nanocrystals**

Gaoyu Chen,^{‡a,b} Xiaoyan Zheng,^{‡a} Chong Wang,^b Junfeng Hui,^a Xuexi Sheng,^b Xiangxing Xu,^{*b}
Jianchun Bao,^b Weijun Xiu,^c Lihui Yuwen^{*c} and Daidi Fan^{*a}

^a Shaanxi Key Laboratory of Degradable Biomedical Materials, Shaanxi R&D Center of Biomaterials and Fermentation Engineering, School of Chemical and Engineering, Northwest University, Xi'an, 710069, P. R. China. E-mail: fandaidi@nwu.edu.cn

^b Jiangsu Key Laboratory of Biofunctional Materials, School of Chemistry and Materials Science, Nanjing Normal University, Nanjing 210046, P. R. China. E-mail: xuxx@njnu.edu.cn

^c Institute of Advanced Materials (IAM), School of Materials Science and Engineering and Key Laboratory for Organic Electronics & Information Displays (KLOEID), Nanjing University of Posts & Telecommunications, 9 Wenyuan Road, Nanjing 210023, P. R. China. E-mail: iamliyuwen@njupt.edu.cn

FIGURES

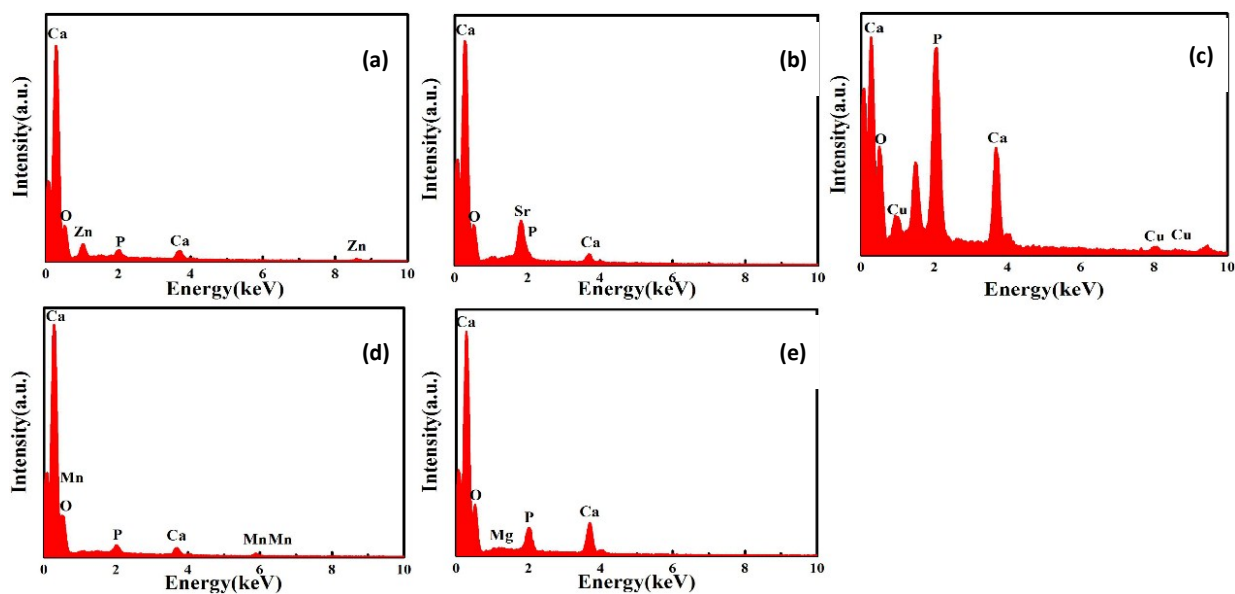


Figure S1. EDS spectra of the HAp nanocrystals doped with (a) Zn²⁺, (b) Sr²⁺, (c) Cu²⁺, (d) Mn²⁺, (e) Mg²⁺.

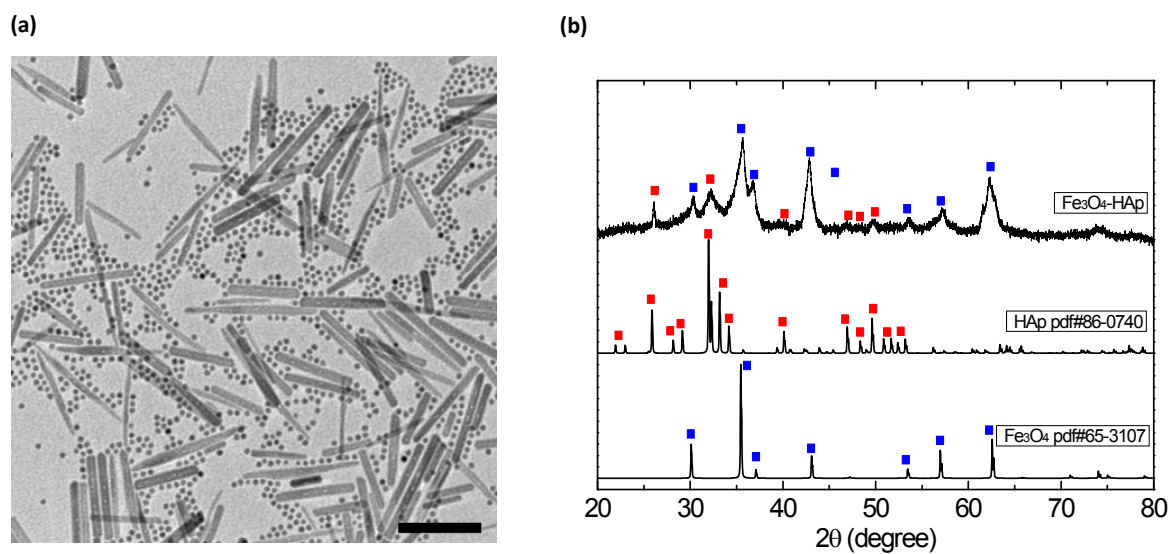


Figure S2. (a) TEM image of Fe₃O₄-HAp nanocrystals, prepared at 300 °C for the ion exchange. (b) XRD of the Fe₃O₄-HAp sample. ((a) scale bar: 100 nm)

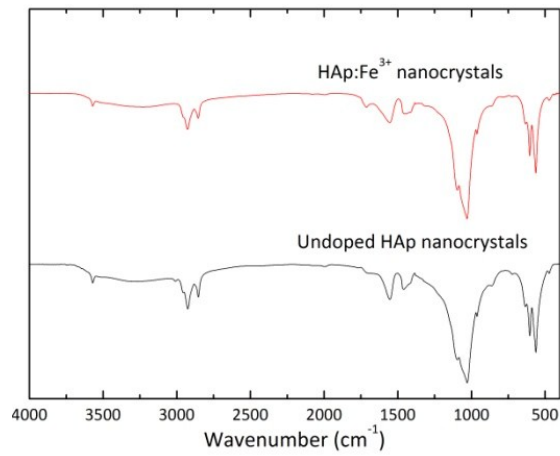


Figure S3. The FTIR spectra of the undoped and Fe³⁺ doped (20.5%) HAp nanocrystals.

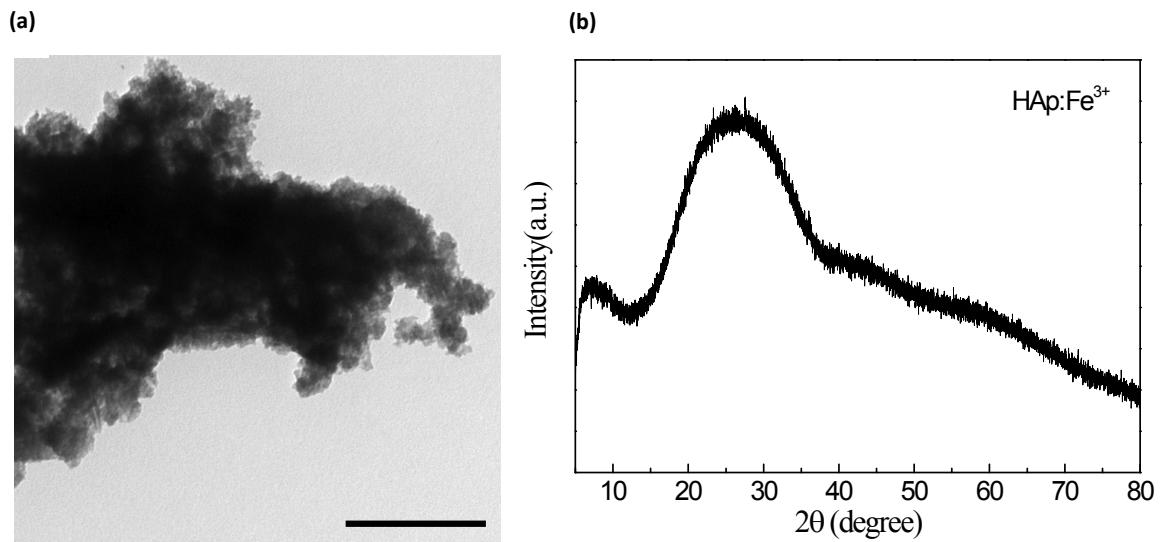


Figure S4. (a) TEM image of HAp nanocrystals ion exchanged with Fe(NO₃)₃ aqueous solutions (the Fe(NO₃)₃ concentration is 0.1 M). (b) The corresponding XRD spectrum indicates that the HAp crystal structure is destroyed, exhibiting a wide peak feature of amorphous phase. ((a) scale bar: 200 nm)

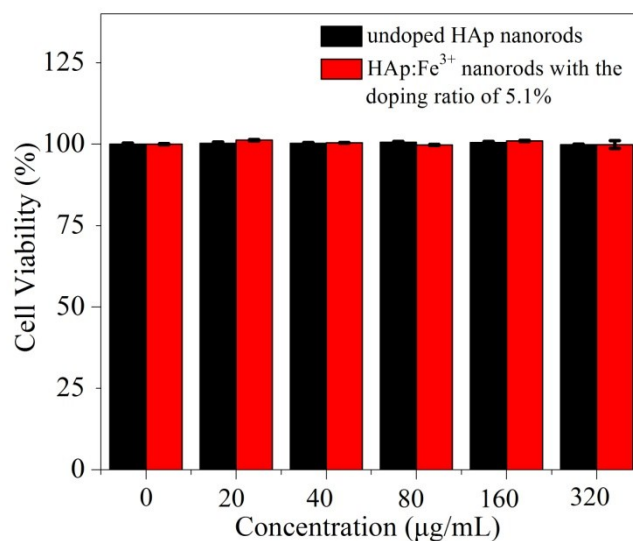


Figure S5. The cytotoxicity assay results of the human cervical carcinoma (HeLa) cells cultured for 24 h at 37 °C in media containing 0–320 µg/mL of HAp:Fe³⁺ nanorods with the doping ratio of 5.1% (postsynthetic ion exchanged at 150 °C, see Fig 5b) and undoped HAp nanorods (Fig 5a) as a control experiment.

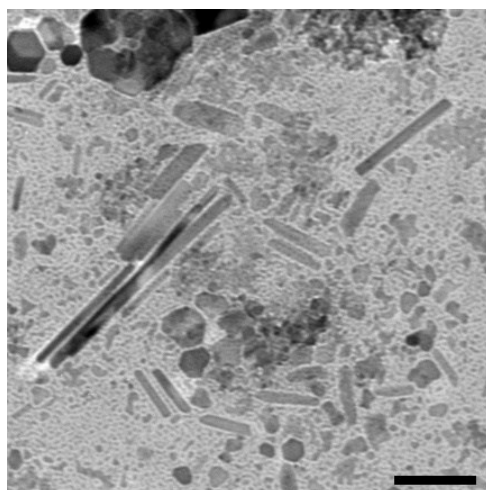


Figure S6. TEM image of the Fe³⁺ doped HAp nanocrystals prepared by the co-nucleation doping. (scale bar: 100 nm)

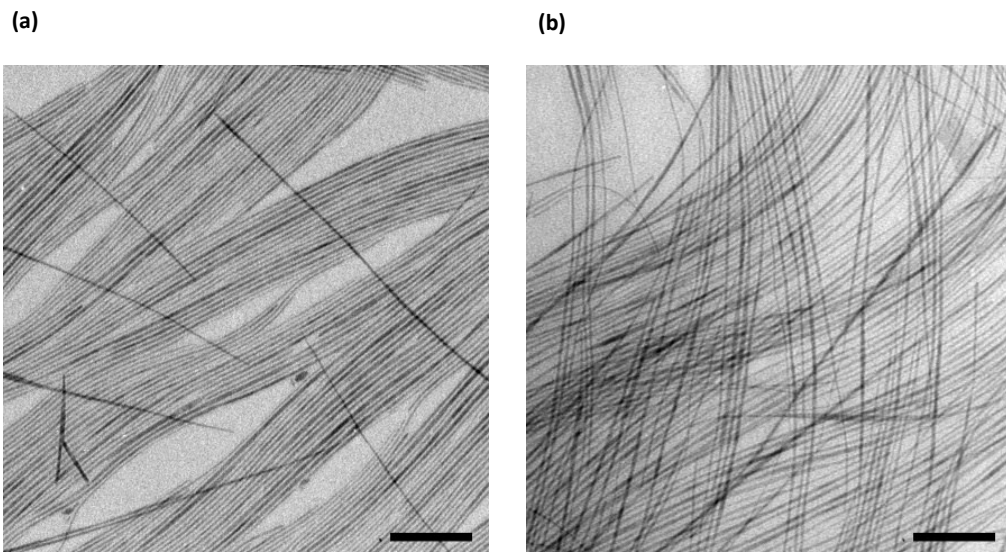


Figure S7. TEM images of (a) Ca-PO₄-CO₃ (CHAp) nanowires and (b) CHAp:Fe³⁺ nanowires with preserved morphology. (scale bar: 100 nm)

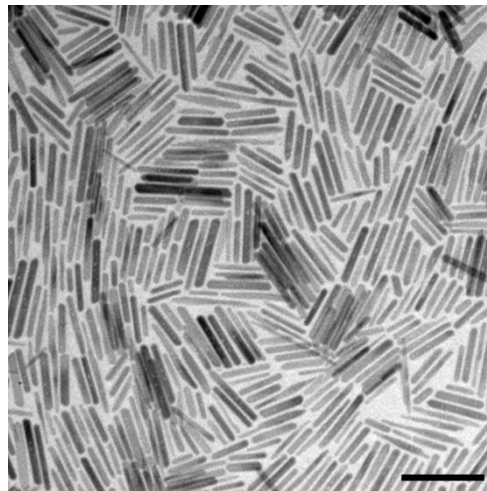


Figure S8. TEM image of bimetallic ions co-doping HAp:Zn²⁺,Cu²⁺ nanorods. (scale bar: 100 nm)