

Supplementary data for the article:

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## Supplementary material

### **Bifunctional (Zn,Fe)<sub>3</sub>O<sub>4</sub> nanoparticles: Tuning their efficiency for potential application in reagentless glucose biosensors and magnetic hyperthermia**

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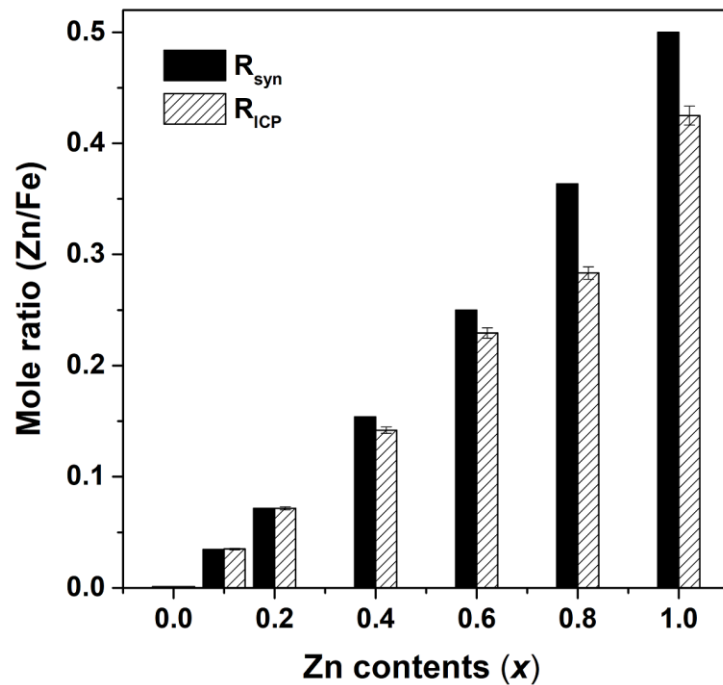


Figure S1. Comparison of Zn/Fe molar ratios in  $Zn_xFe_{3-x}O_4$  samples from ICP ( $R_{ICP}$ ) with those in the synthesis ( $R_{syn}$ ).

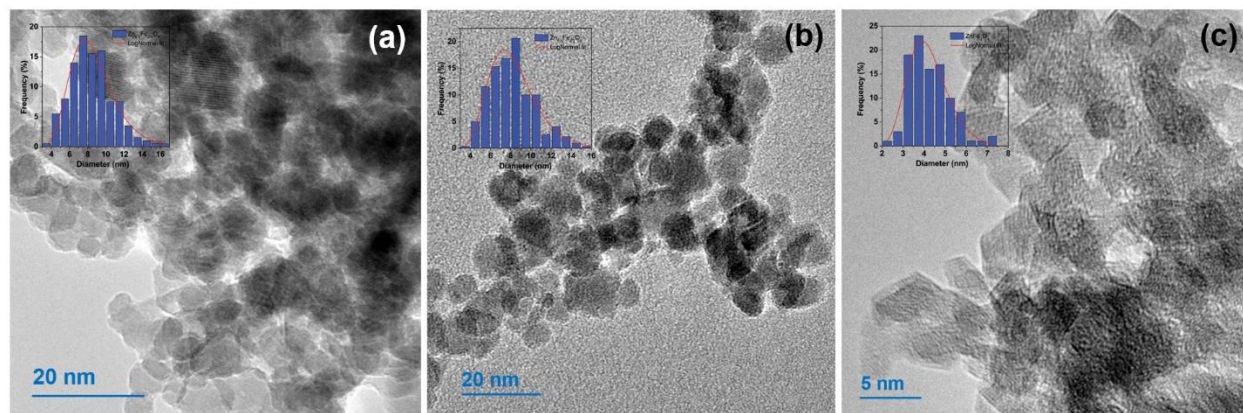


Figure S2. TEM micrography of  $Zn_xFe_{3-x}O_4$  nanoparticles and the particle size distribution histograms with x content of (a) 0.56; (b) 0.66 and (c) 0.85.

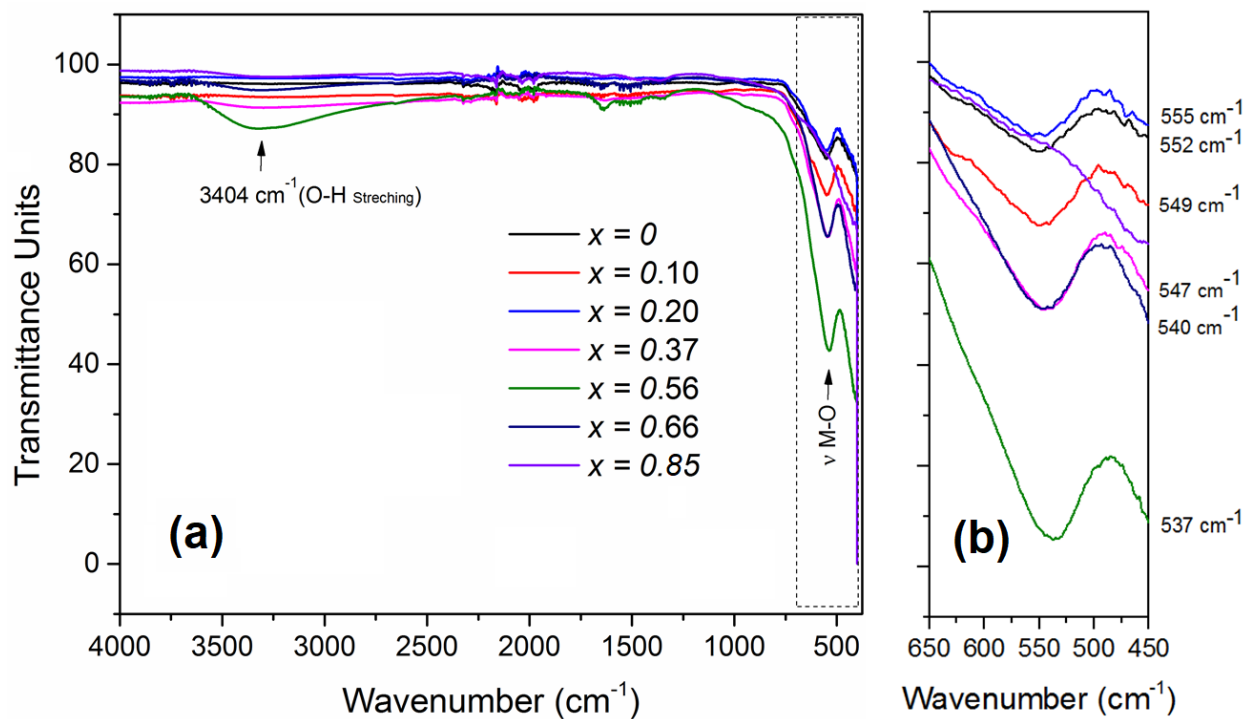


Figure S3. (a) FT-IR spectra of  $Zn_xFe_{3-x}O_4$  (with  $x = 0, 0.10, 0.20, 0.37, 0.56, 0.66$  and  $0.85$ ) (b) magnification on the fingerprint range of the FT-IR spectra showing metal-oxygen stretching.

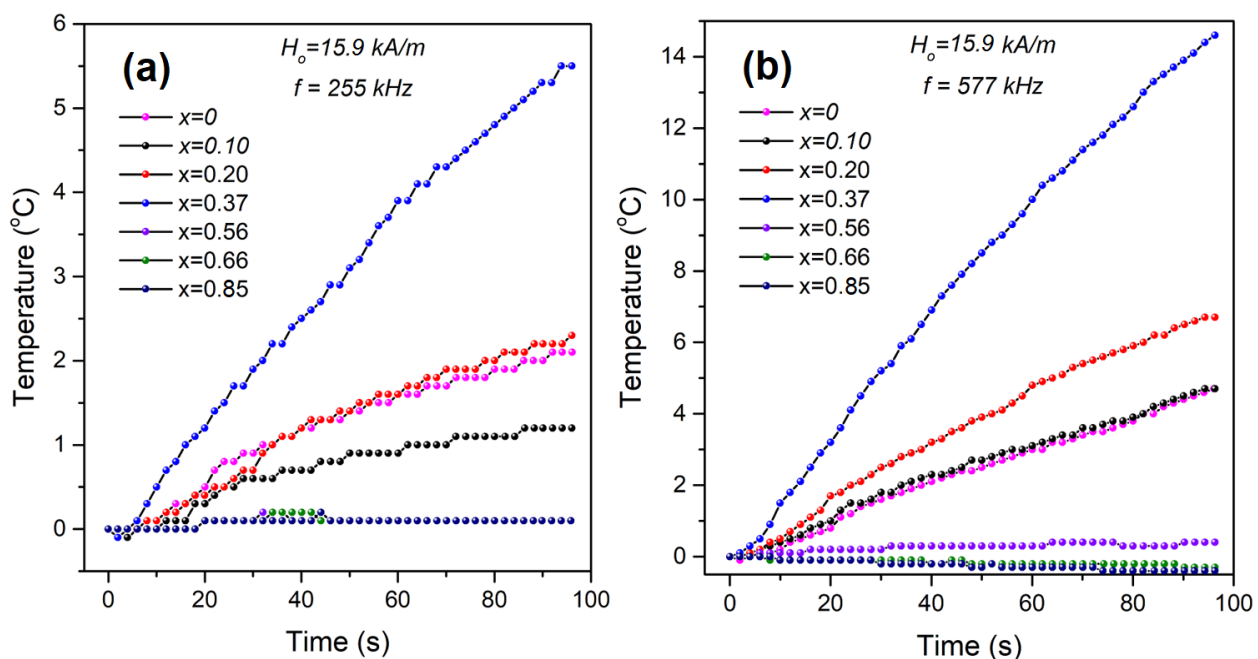


Figure S4. Kinetic heating curves of  $Zn_xFe_{3-x}O_4$  nanoparticles with different Zn content (a) at frequency of 255 kHz, (b) at frequency of 577 kHz.

Table S1. Magnetic properties at 300 K of  $Zn_xFe_{3-x}O_4$  NPs samples  $M_S$ ,  $M_R$  and  $H_c$  are saturation magnetisation and, reduced remnant magnetisation and coercivity, while SAR denotes for specific absorption rate.

Sample	$M_S$ (emu/g)	$M_R$ (emu/g)	$H_c$ (Oe)	SAR@252 kHz (W/g)	SAR@577 kHz (W/g)
$Fe_3O_4$	77.29	4.91	43.19	52.2	83.8
$Zn_{0.10}Fe_{2.80}O_4$	91.38	4.08	49.33	39.0	88.4
$Zn_{0.20}Fe_{2.80}O_4$	88.25	2.02	13.56	41.3	135.1
$Zn_{0.37}Fe_{2.63}O_4$	90.23	0.77	4.41	106.4	261.2
$Zn_{0.56}Fe_{2.44}O_4$	49.2	1.54	23.5	9.4	11.1
$Zn_{0.66}Fe_{2.34}O_4$	43.36	0.37	43.63	8.0	2.0
$Zn_{0.85}Fe_{2.15}O_4$	3.09	0.01	12.53	6.9	1.2

Table S2. Results<sup>a</sup> obtained for determination of glucose in prepared samples.<sup>a</sup>n=3

Sample	Our method (mM)	Commercial glucometer (mM)
S1	$2.1 \pm 0.1$	2.0
S2	$5.0 \pm 0.2$	4.9
S3	$7.2 \pm 0.3$	7.1
S4	$10.2 \pm 0.3$	10.3
S5	$18.6 \pm 0.6$	18.4