Supporting Information

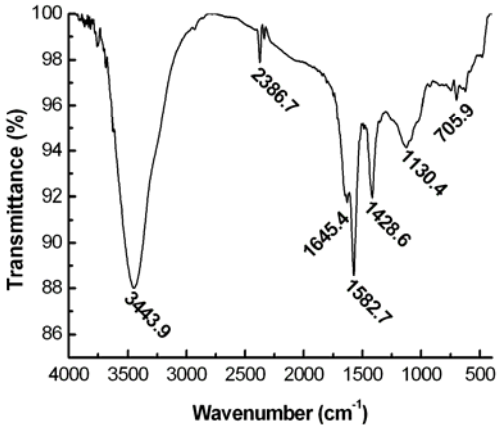


Figure SI0 FTIR spectra of graphite oxide (GO) sheets

GO sheets was prepared by a modified Hummers methods (Refs. 21 and 22). The concentration of GO (1mg/mL) was determined by measuring the mass of the GO dried from a certain volume of GO suspensions. The FTIR spectra were recorded on a Perkin Elmer Paragon-1000 spectrometer in the wavenumber range of 400-4000 cm^{-1}. 1 µL GO solution (1 mg/mL) was dipped on the surface of KBr pellets, and then the KBr pellets were dried by a Fourier infrared light for 1 h. Intense peak at 3443.9 cm^{-1} is assigned to the O-H stretching vibrations. The peak at 1645.4 cm^{-1} is attributed to the C=O stretching vibrations from carbonyl and carboxylic groups. The peaks at 1582.7, 1428.6 and 1130.4 cm^{-1} are assigned to the skeletal vibrations from unoxidized graphitic domain, C-OH stretching vibrations and C-O stretching vibrations, respectively. These active surface groups (e.g., -COOH, -OH and –C=O) may act as the nucleation sites for the Fe^{2+} precipitates and then lead to homogeneous distribution of Fe^{2+} precipitates on the surface of GO sheets.

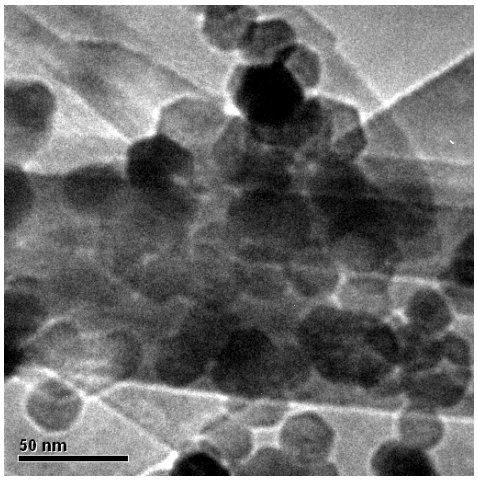
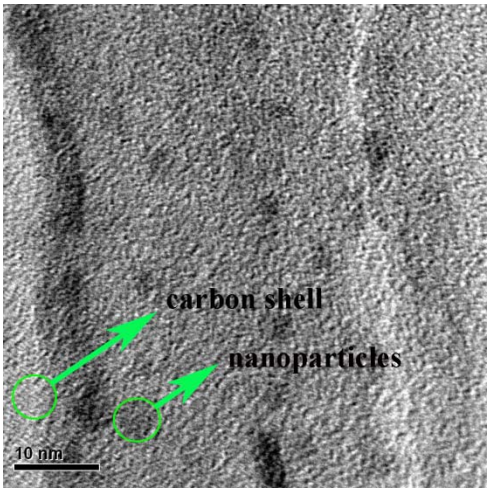


Figure SI1 TEM image of the obtained products after hydrothermal reaction (200 ^{o}C, 10 h)

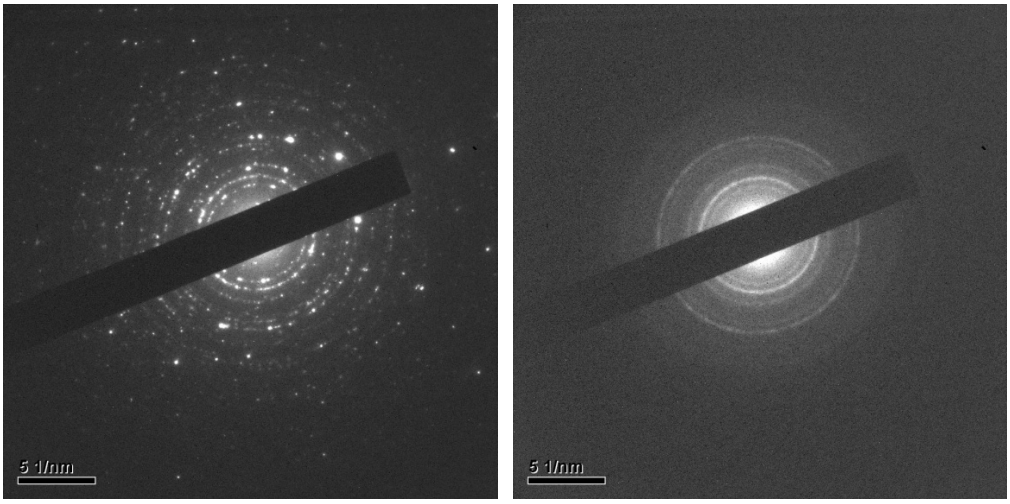
Figure SI2 Visual image of Fe_3O_4@C nanotubes dispersed in deionized water

Figure SI3 Separation of Fe_3O_4@C nanotubes by an external magnet

Figure SI2 and Figure SI3 suggest that the synthesized Fe_3O_4@C nanotubes have good water solubility. They can be easily homogeneously dispersed in deionized water and isolated by a magnet within several seconds. Fe_3O_4@C nanotubes materials can also redisperse quickly with a slight shake once the magnet is removed. It suggested that the Fe_3O_4@C nanotubes possess excellent magnetic responsivity and redispersibility, which is a prominent advantage to their applications.



The sites for SAED analysis were signed as a ring (HRTEM in Figure 1f)



SAED patterns of inserted Fe_3O_4 nanoparticles (Left, Figure SI4) and carbon shell (right, Figure SI5)

The carbon shell originated from GO sheets has many cavities due to the removal of oxygen functionalities after hydrothermal treatment. The exposed dark Fe_3O_4 nanoparticles in Figure 1f are part of large Fe_3O_4 particles inside the carbon shell. Since decomposition reaction of Fe^{2+} precipitates takes place in a homogeneous system, it may generate numerous dispersed Fe_3O_4 nanoparticles. According to Figure SI1, the average sizes of large Fe_3O_4 particles inside the carbon shell were about 25-40 nm.

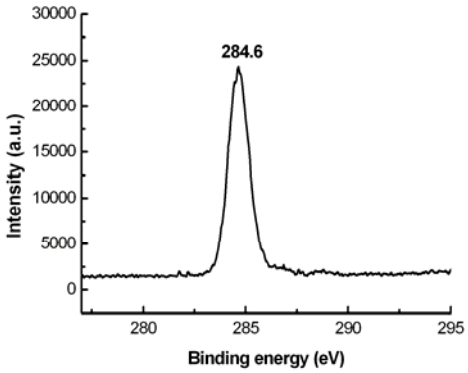


Figure SI6 XPS spectra of C1s for the Fe_3O_4@C nanotubes

SI7-**MTT assays**: As for vitro cellular study, healthy human gastric cells GES-1 were seeded into 96-well plates at a density of 10^4 in 100 μL of medium per well and grown in RPMI 1640 cells medium supplemented with 10 % NCBS, 100 units/mL penicillin and 0.1 mg/mL streptomycin under standard conditions in a conventional incubator with 5 % CO_2 at 37 ^{o}C overnight. The Fe_3O_4@C nanotubes were dispersed in cell culture medium after sterilization and obtained different concentrations of Fe_3O_4@C nanotubes (5, 10, 15 and 20 μg/mL). The cells were then treated with different concentrations of Fe_3O_4@C nanotubes respectively with 100 μL per well and allowed for 36 hrs of incubation.

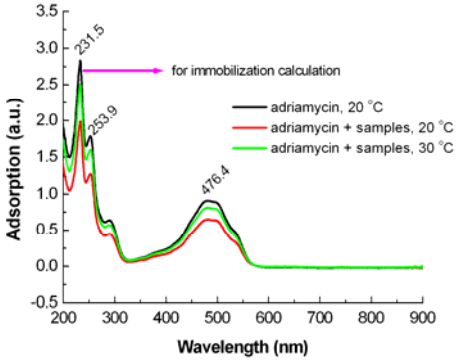
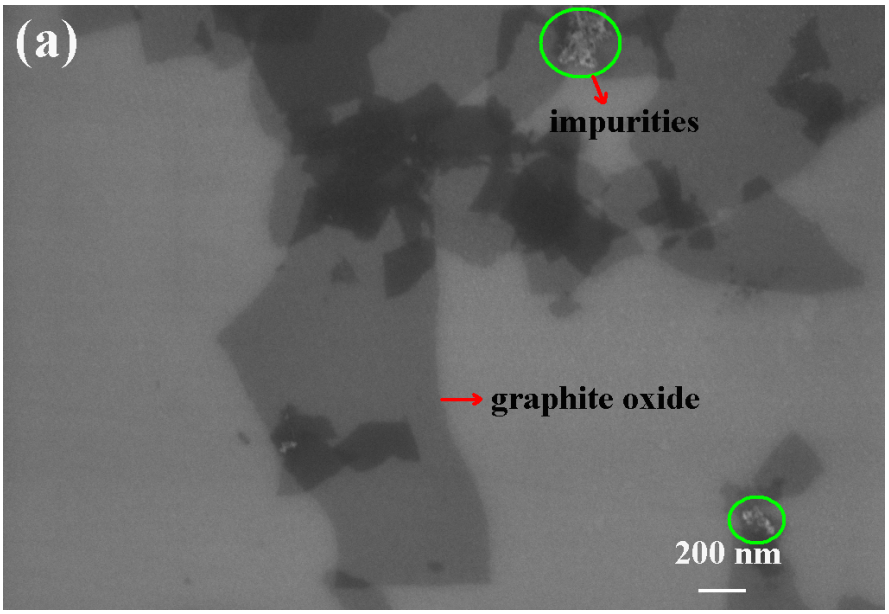


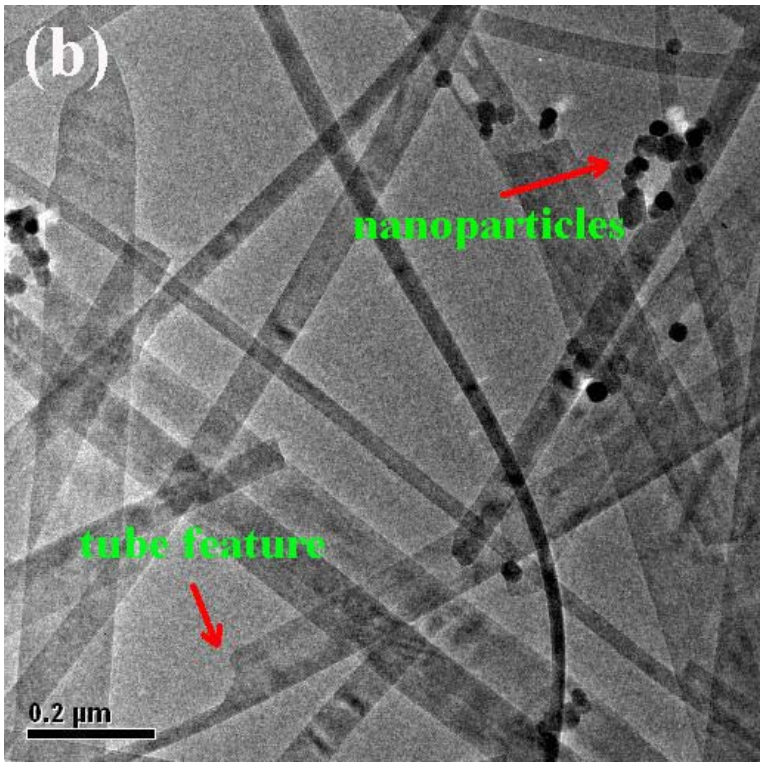
Figure SI8 UV-vis spectrum of adriamycin solution before and after immobilization by the synthesized Fe_3O_4@C nanotubes.

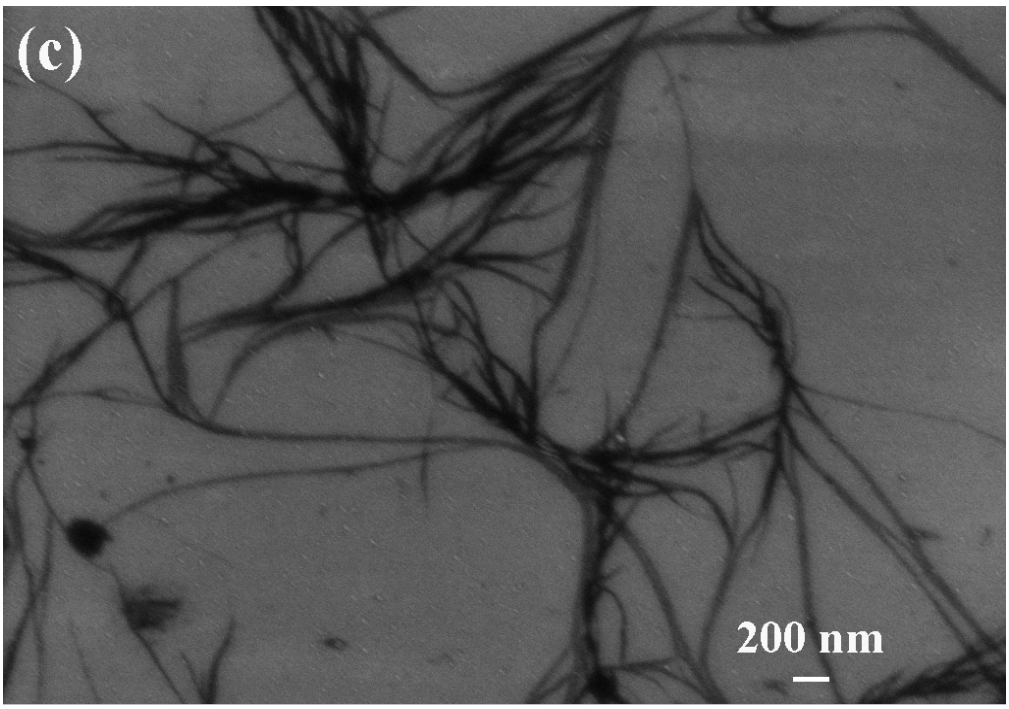
Adriamycin immobilization: 2 mg Fe_3O_4@C nanotubes were dispersed in 0.8 mL adriamycin solution (1mg/mL). Then the mixture was diluted three times by deionzed water, sealed in a 5 mL centrifuge tube dealt with different temperatures (20 and 30 ^{o}C) under gentle rotation for 15 min. After reaction, the Fe_3O_4@C nanotubes in solution were removed by a magnet, and the separated solution was used to the UV-vis absorption spectrum measurement. UV adsorption measurements were conducted on all the solution before and after immobilization by Fe_3O_4@C nanotubes. The amount of immobilized adriamycin was calculated by comparing the UV absorption value of adriamycin solution before and after immobilization. UV-vis absorption spectra of samples were measured on a Shimadzu UV-2450 spectrophotometer at a wavelength of 500 nm.

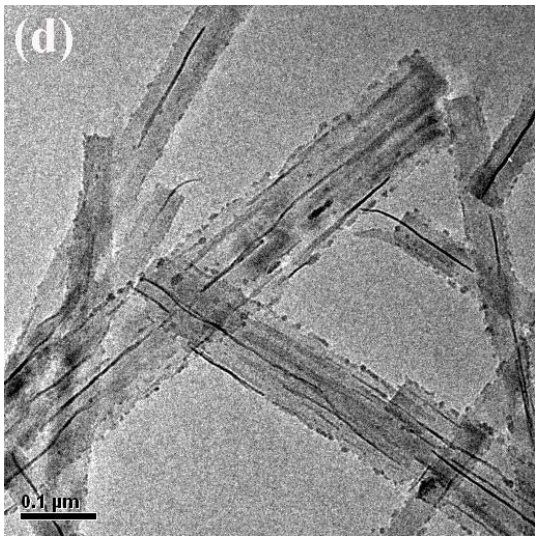
Enlarged figures used in this manuscript

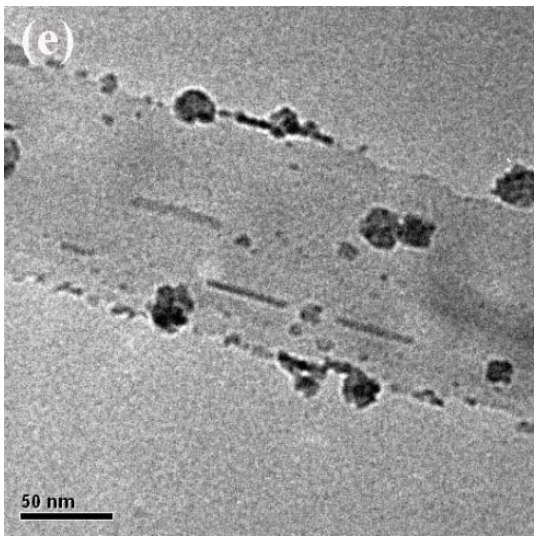
Figure 1:

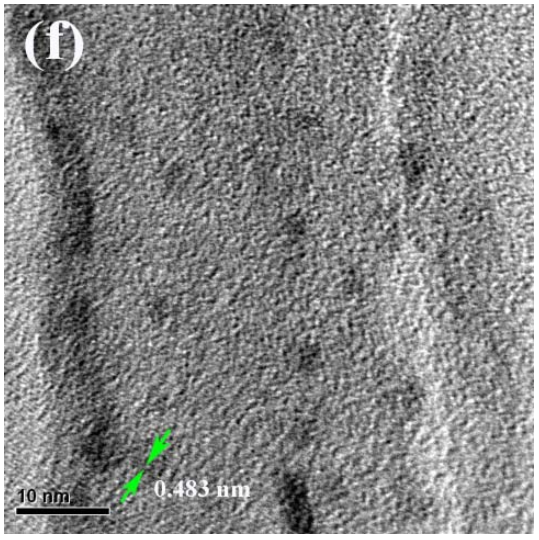












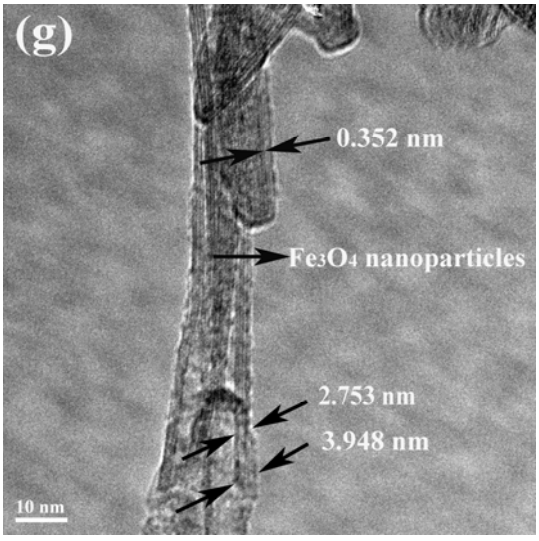
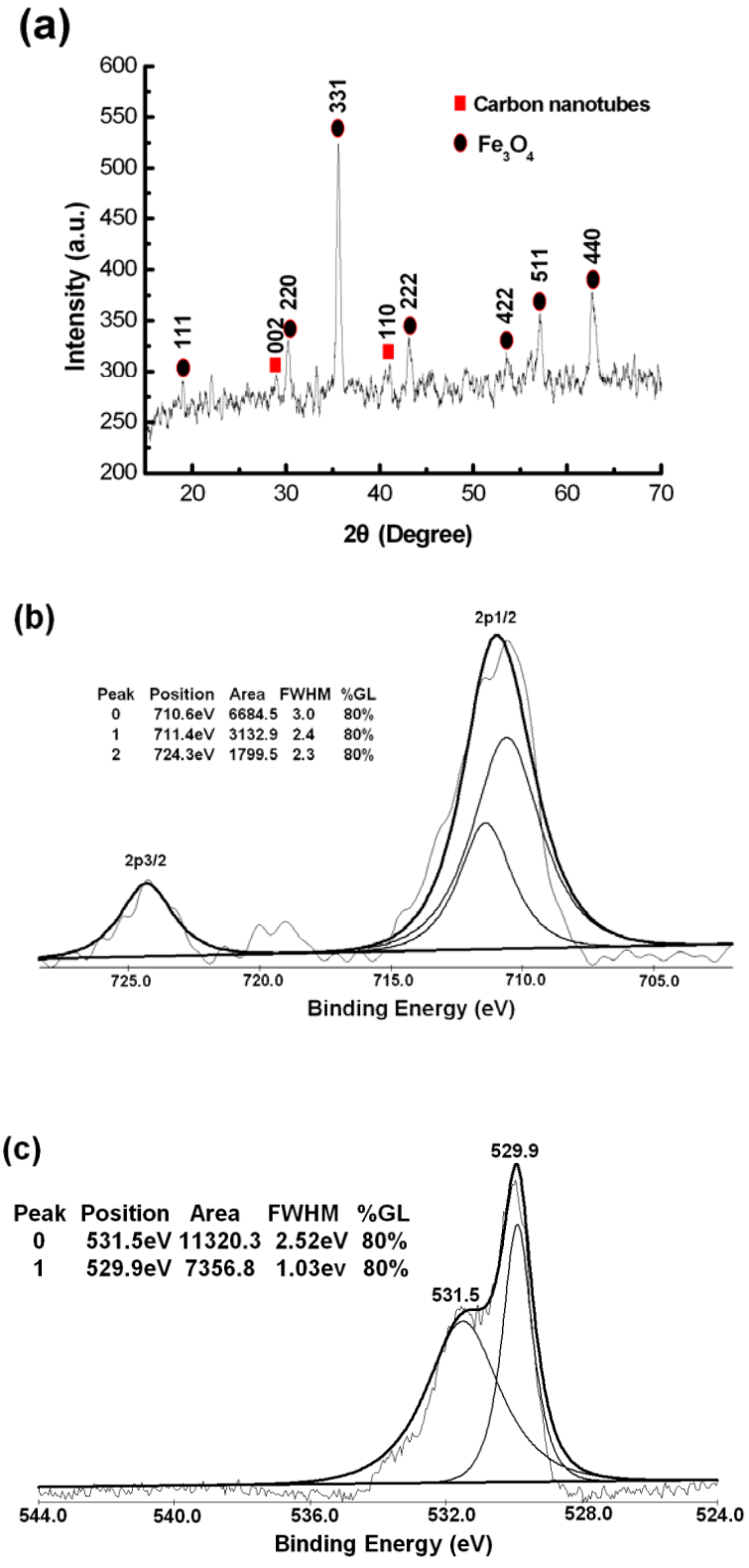
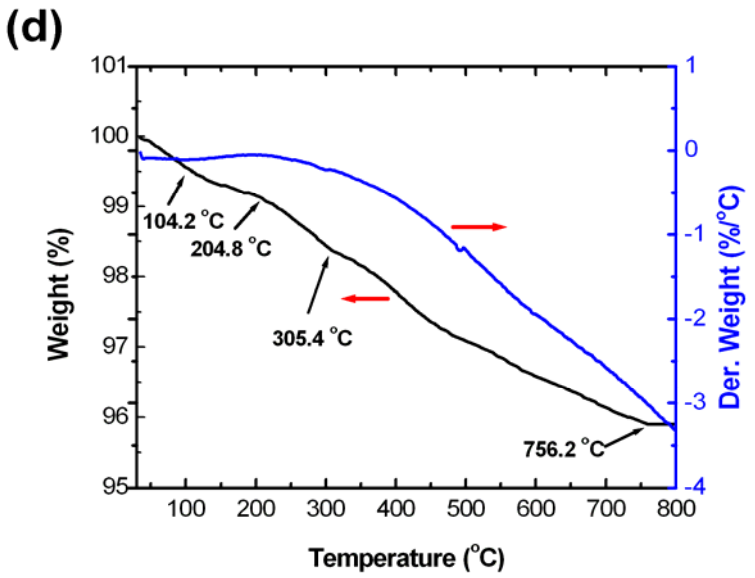


Figure 2:





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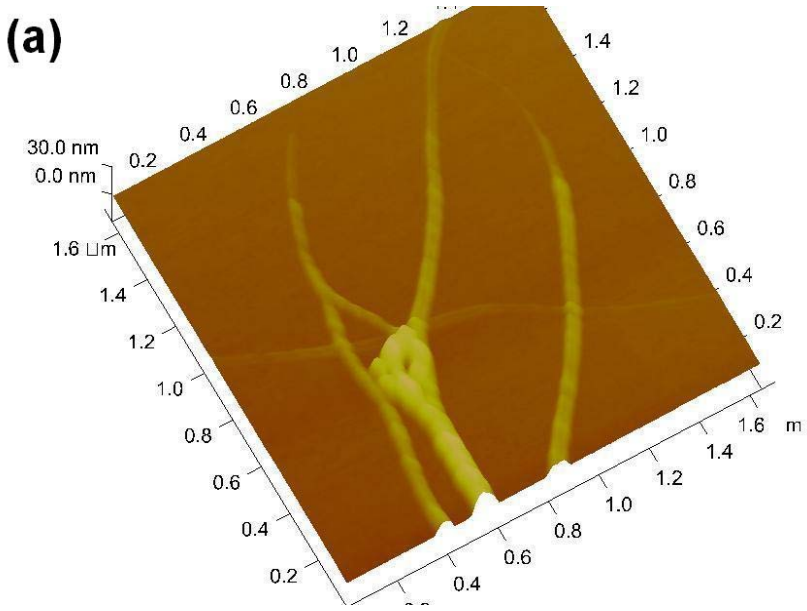

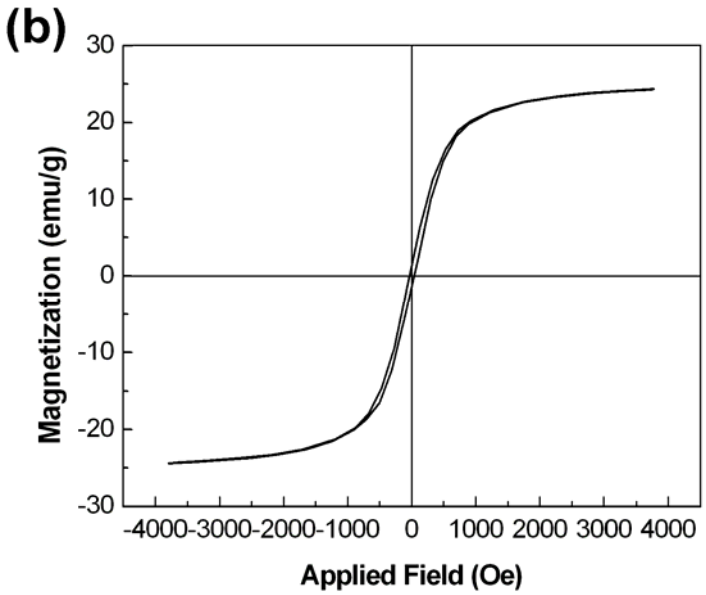
(b)
Magnetization (emu/g)
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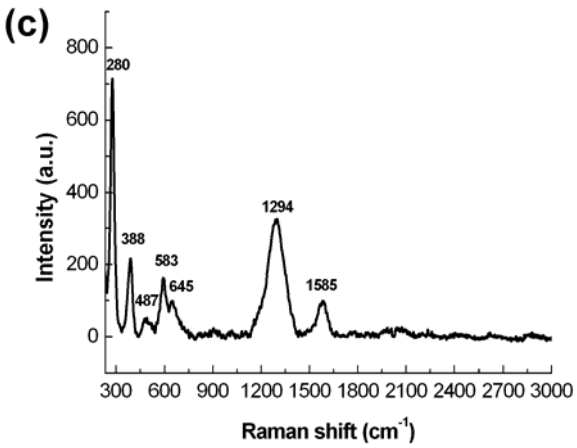
20
10
0
-10
-20
-30
-4000-3000-2000-1000 0 1000 2000 3000 4000
Applied Field (Oe)


(c)
Intensity (a.u.)
800
600
400
200
0
280
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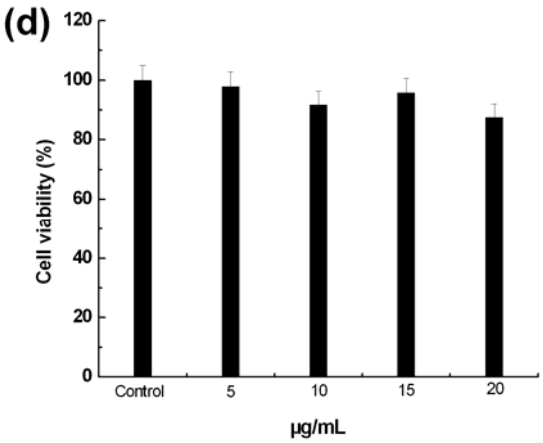
487
583
645
1294
1585
300 600 900 1200 1500 1800 2100 2400 2700 3000
Raman shift (cm-1)


(d)
Cell viability (%)
120
100
80
60
40
20
0
Control
5
10
15
20
μg/mL