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## **Supporting Information for**

Comparison of benzene and toluene photodegradation under visible light irradiation by Ba-doped

BiFeO<sub>3</sub> magnetic nanoparticles with fast sonochemical synthesis

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The quantitative EDS analysis results, shown in Fig.S1, indicate that the molar ratio of bismuth, iron and oxygen in pure BFO MNPs was about 1:1:3. In the Ba doped BFO MNPs, EDS composition analysis demonstrated successful doping of Ba. The amount of Ba detected by EDS analysis was slightly less than that actually added during the synthesis; 6.69 % Ba was detected for 7 % Ba-doped BFO MNPs.



**Fig.S1.** EDS images of Bi<sub>1-x</sub>Ba<sub>x</sub>FeO<sub>3</sub> MNPs, (a): x=0.0, (b):x=0.07.

Further evidence for the quality and composition of the nanoparticles was obtained from XPS studies. The survey spectra from 0 to 1000 eV for pure and Ba doped BFO MNPs were shown in Fig. S2, confirming the presence of Bi, Fe, O and minor quantities of Ba without any trace of other impurities, except a small amount of adsorbed carbon peak C 1s at 285 eV that was used to calibrate the system.



Fig. S2.The survey spectra of  $Bi_{1-x}Ba_xFeO_3$  (x=0, 0.02, 0.04, 0.07).