Electronic Supplementary Information (ESI)

One-pot preparation of amin-rich magnetite/bacterial cellulose nanocomposite and its application for arsenate removal

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1. Preparation of magnetite nanoparticles composites

Surface amine-functionalized MNPs were synthesized according to the procedure: anhydrous sodium acetate (1.6 g) and $FeCl_3 \cdot 6H_2O$ (0.8 g) were dissolved in ethylene glycol (24 mL) with vigorous stirring at 50 ^oC to give an orange solution. When 1,6-hexanediamine (7 mL) was added, the solution turned to dark-orange. Then magnetite nanoparticles composites BC@MH were synthesized by soaking 3.0 g never-dried BC pellicle into above solution for 24 h before solvothermal was carried out at 200 ^oC for 6 h. After cooling to room temperature, the BC magnetite composites were collected from the solution by employing a magnet and was rinsed with DI water followed by ethanol each for 3 times to remove the remaining chemicals. The obtained magnetite bacterial cellulose nanocomposites was designated as BC@MH and kept in DI water for future use.

Table S1 Energy dispersive X-ray (EDX) results of BC and BC@MH

Sample	Weight (%)		
	C	**O**	**Fe**
BC	42.27	57.73	-
BC@MH[a]	14.94	37.02	48.04
BC@MH[b]	15.26	32.27	52.47

[a] on the particle.
[b] on the fiber.

2. Video S1 Response of aminated magnetite-BC nanocomposites (BC@MH) towards an external magnetic field

3. Ninhydrin test for amine group

The present of amine in MH and BC@MH were determined by using ninhydrin reagent. Typically, 20 mg (approximately 0.2 x 0.2 cm) of BC@MH or MH was added to 100 µL of ninhydrin reagent (ethanol 99.8%, 80 w/v% phenol and 5 w/v% ninhydrin) and 100 µL DI water. The reaction carried out at 90 ^{o}C for 5 minutes. After cooling at room temperature added 800 µL DI water. Amine groups on the sample will react with the reagent produces purple colored solution.

Fig. S1 Ninhydrin test for amine group assay (a) amine-functionalized MNPs (MH), (b) aminated magnetite-BC nanocomposites (BC@MH) for ten times dilution.

4. Magnetic property

The magnetic property of magnetic nanoparticles (MNPs) was studied by a superconducting quantum interference device (SQUID, LakeShore 7307) magnetometer. 60 mg dry of MH or BC@MH was place in a capsule, and then put them in the instrument for measured the magnetization.

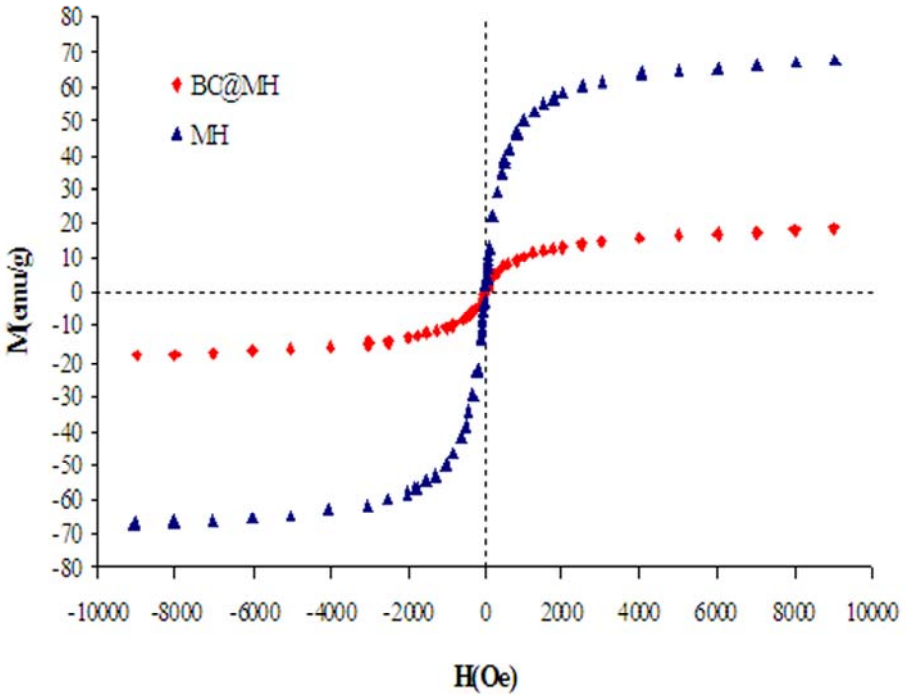

Fig. S2 Room temperature magnetization curves of amine-functionalized MNPs (MH) and aminated magnetite-BC nanocomposites (BC@MH).

5. Mechanical property

Mechanical testing was performed on a testometric test machine (M500-25AT) using a load cell of 10 kg operating at a deformation rate of 100 mm s^{-1} for BC and BC@MH, and was performed under ambient conditions. BC and BC@MH were dried at 130 ^{o}C in an oven before test. Five samples were tested for each data. Tensile-strain and elongation to break were calculated using the Win test software.

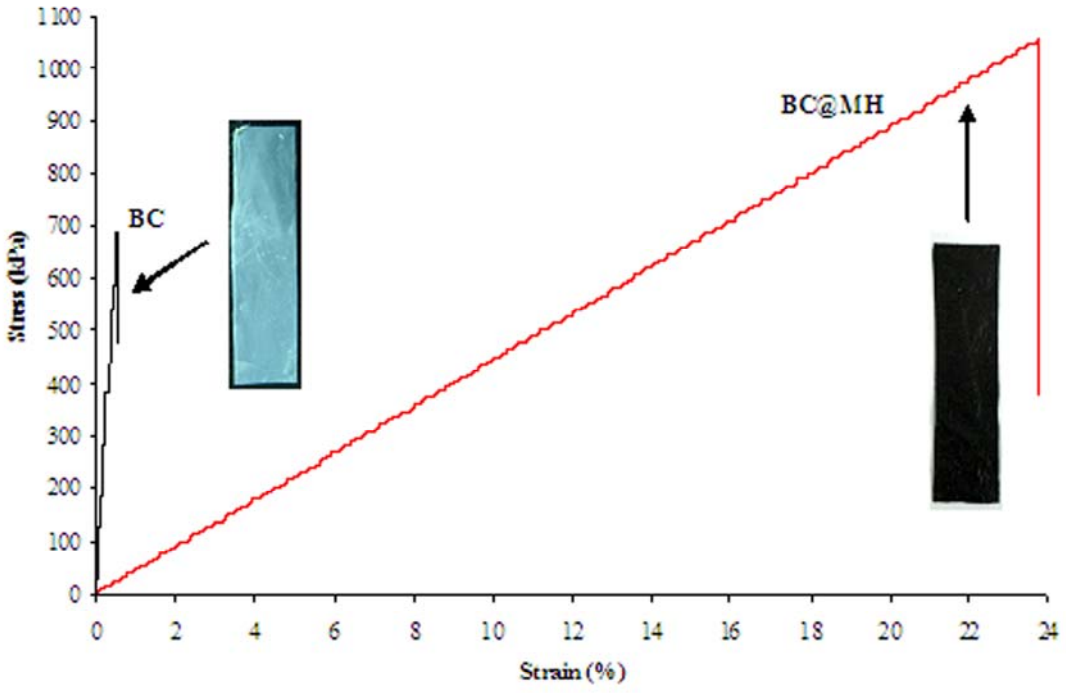

Fig. S3 Stress-strain curve of bacterial cellulose (BC) aminated magnetite-BC nanocomposites (BC@MH) and insert: dry BC and dry BC@MH.

6. Reusable of BC@MH

To regenerate BC@MH for repeated use, As(V) was desorbed from BC@MH (1 w/v%) by shaking in 0.1 M NaOH for 24 h. After washing thoroughly with DI water, the regenerated BC@MH was loaded for the next cycle of As(V) adsorption in the same condition.

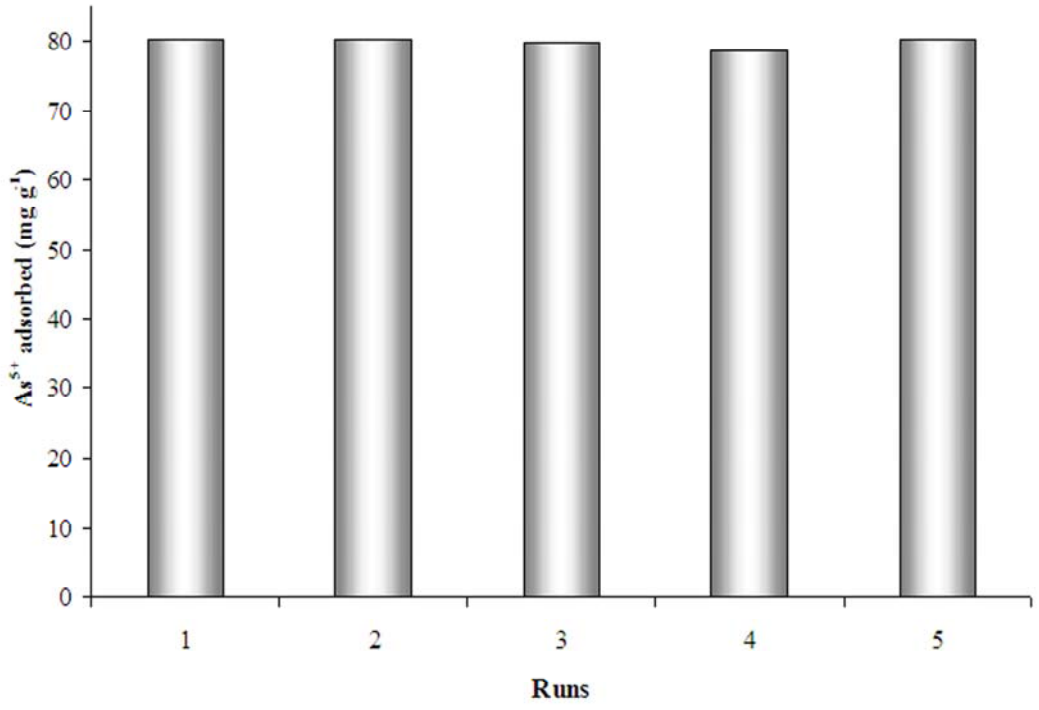

Fig. S4. The adsorption performance of BC@MH during 5 repeated used for adsorbing 7 ppm As(V) solutions at 25 ^{o}C for 30 h at pH 3.