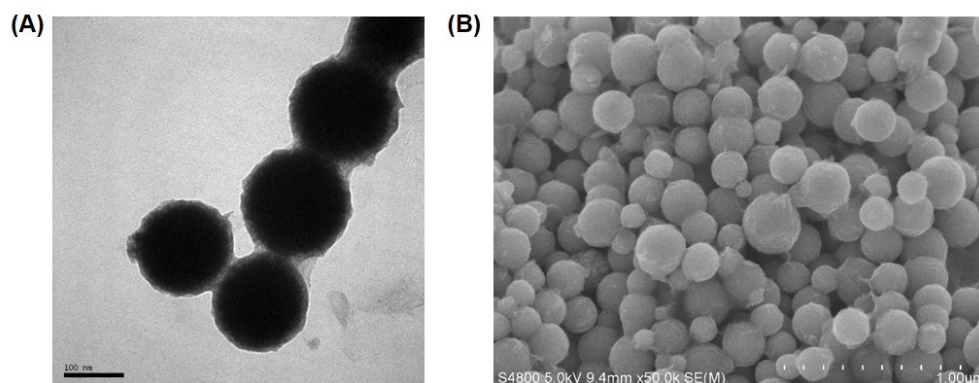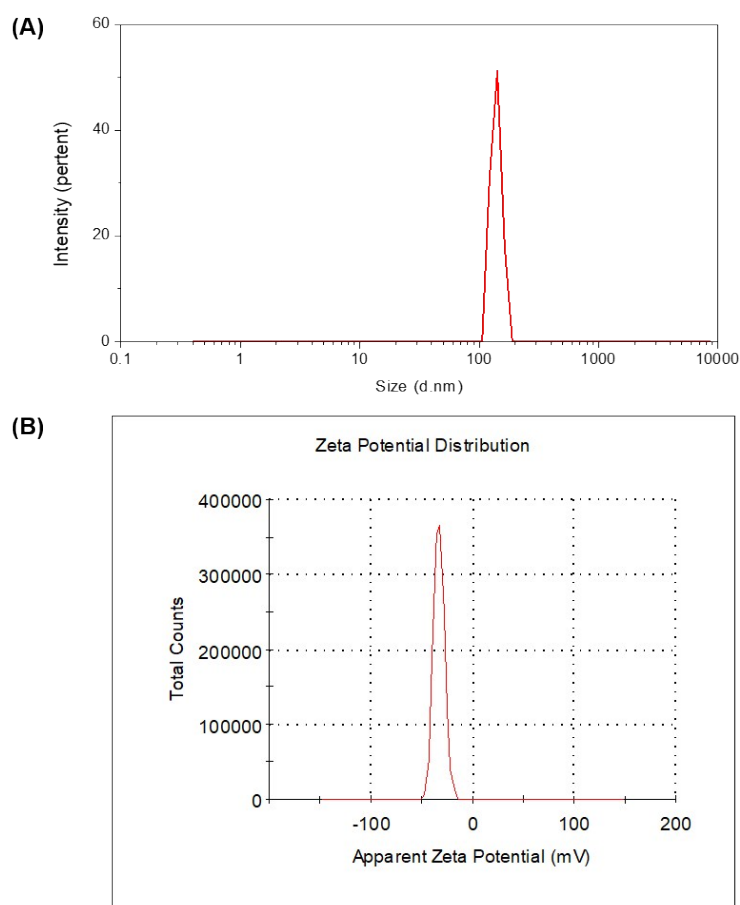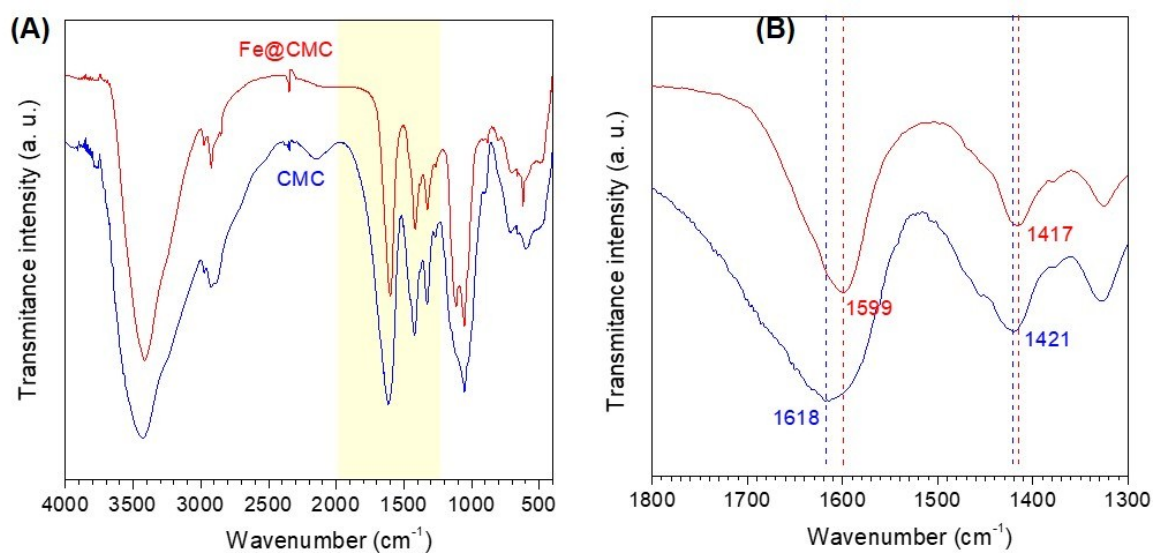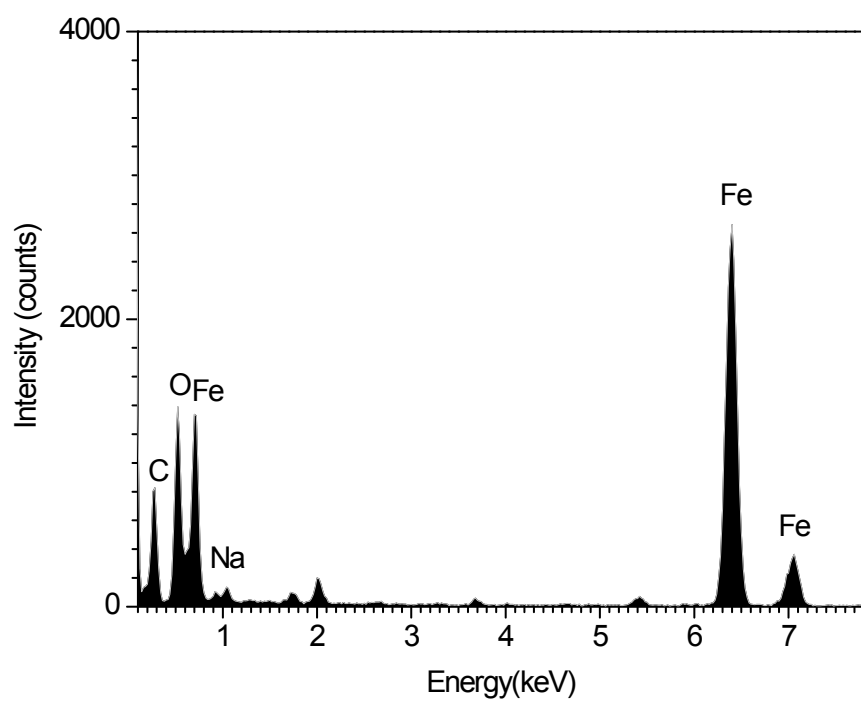# Supporting information

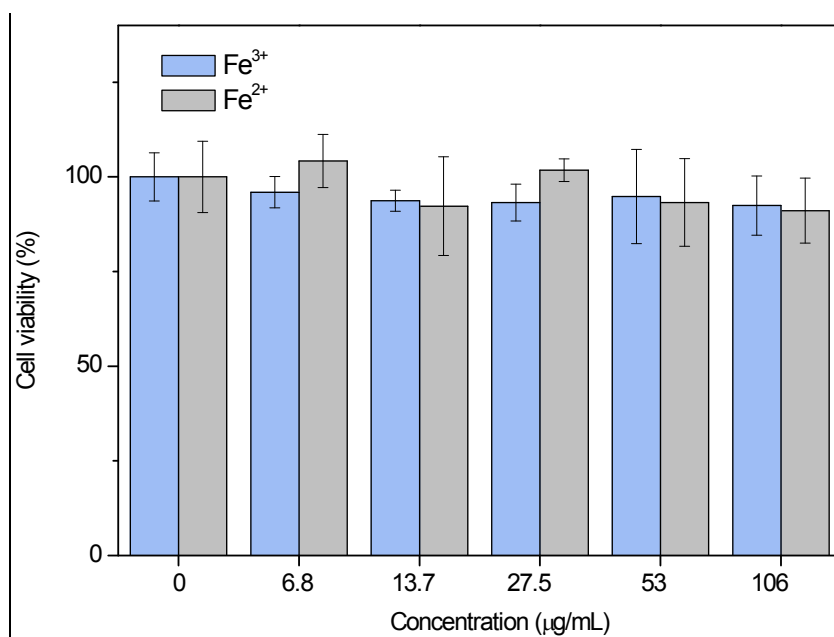**Figure S1** (A) TEM of Fe@CMC nanoparticles. (B) SEM of Fe@CMC nanoparticles.

Figure S2 (A) Size distribution of Fe@CMC nanoparticles. (B) Zeta potential distribution of Fe@CMC nanoparticles.
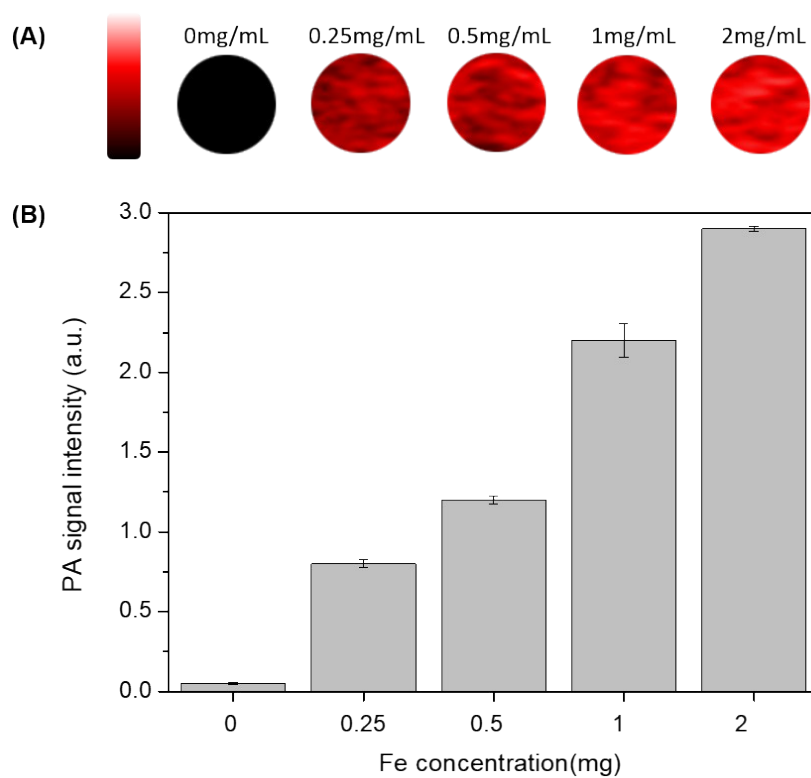
Figure S3 FTIR spectra of CMC and Fe@CMC materials.
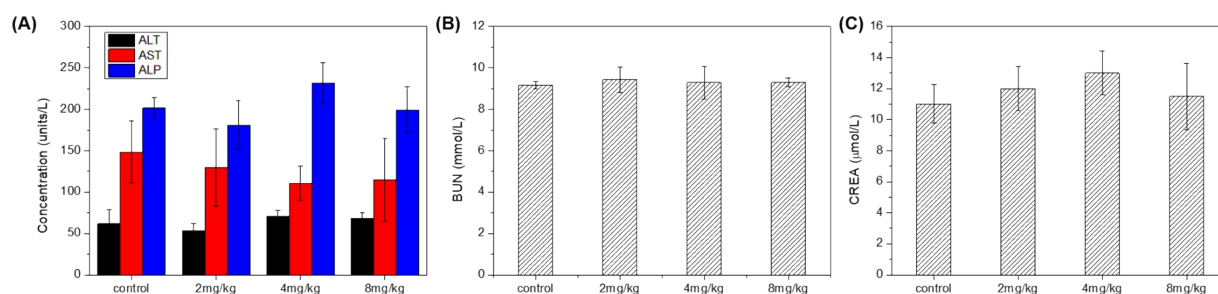

Figure S4 EDS spectra of Fe@CMC.

**Figure S5** Cytotoxicity of Fe^{3+} and Fe^{2+} ions to B16 cells.

Figure S6 The dependence of Fe imaging signal of Fe@CMC nanoparticle solution on its concentration. Figure B is the quantitative stastical analysis of Figure A.

Figure S7 Blood biochemical analyses including liver functions (A) and kidney functions (B, C). ALP, alkaline phosphatase; ALT, alanine transaminase; AST, aspartate transaminase; CREA, creatinine; BUN, blood urea nitrogen (n =3). Mean value and error bar are defined as mean and s.d., respectively.
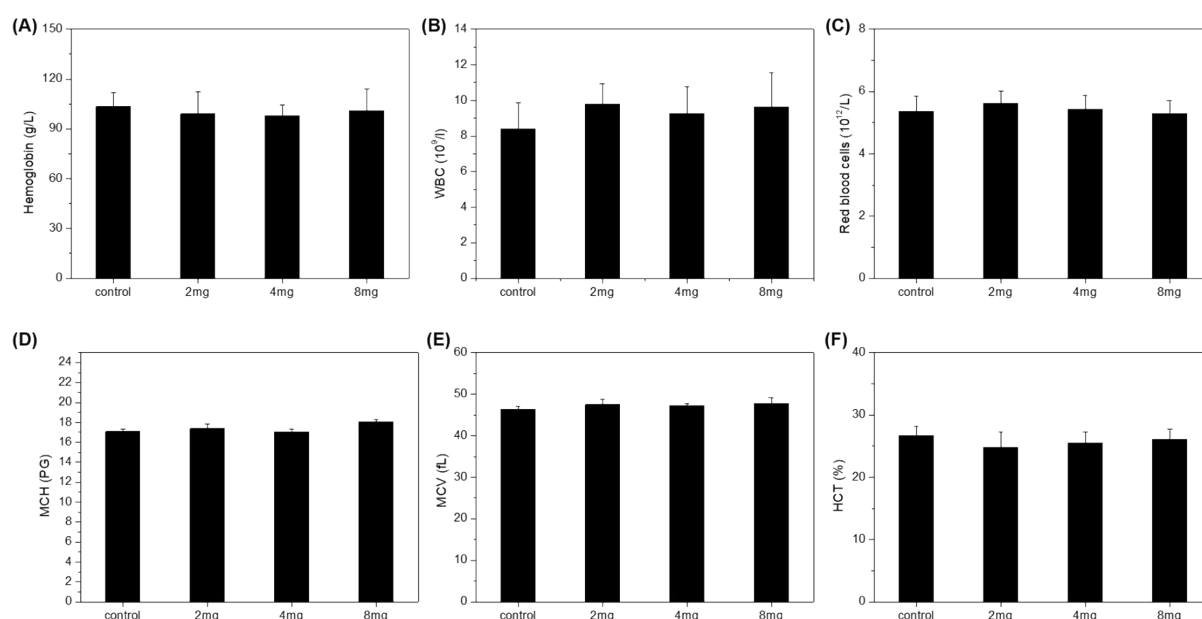

Figure S8 The evaluation of standard haematology markers including HGB(A), WBC(B), RBC(C), MCH(D), MCV(E), HCT(F). HGB, haemoglobin; WBC, white blood cells; RBC, red blood cells; MCH, mean corpuscular hemoglobin; MCV, means corpuscular volume; HCT, haematocrit width (n = 3). Mean value and error bar are defined as mean and s.d., respectively.
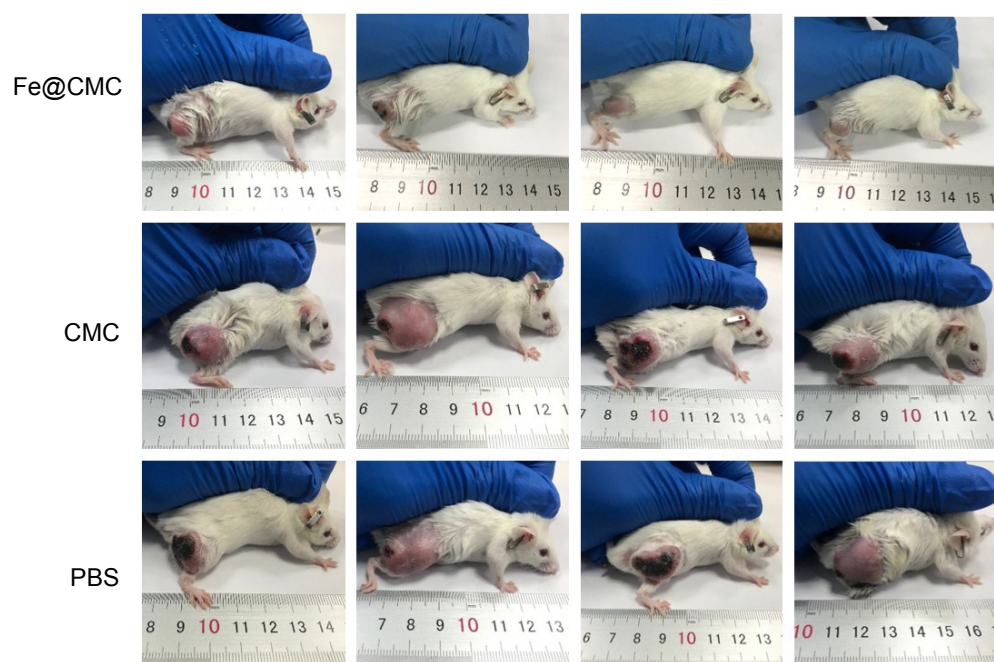
Figure S9 Digital photos of tumor-bearing mice treated with PBS, CMC, Fe@CMC for 14 days.
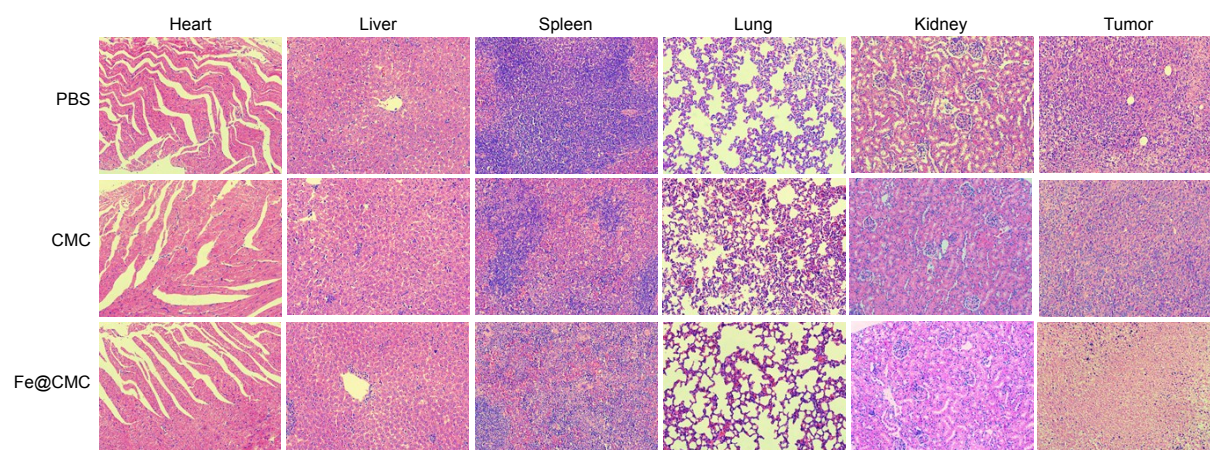
Figure S10 Histological examination of main organs (heart, liver, spleen, lung and kidney) and tumors from mice treated with the PBS blank control, and the Fe@CMC group, respectively, by the H&E staining method.
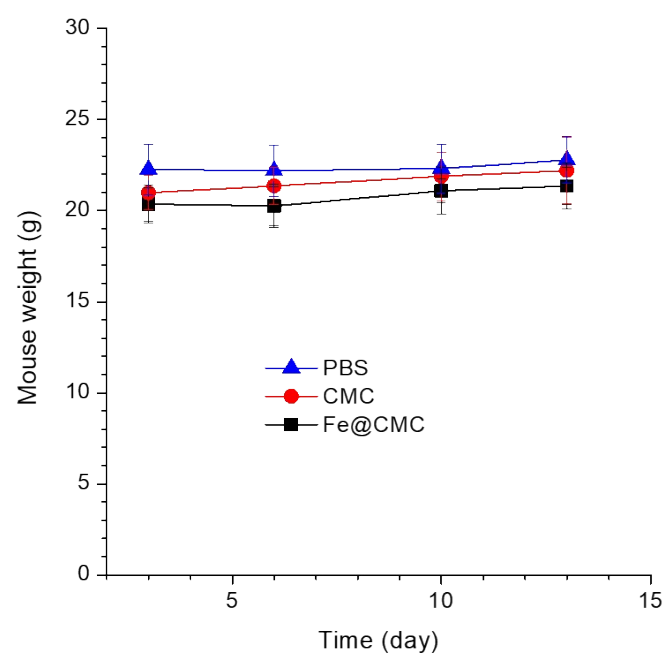
Figure S11 The body weight change of 4T1 tumor-bearing mice during treatment.