Supporting Information for

pH/ magnetic dual responsive Pickering emulsion stabilized by Fe_3O_4@SiO_2@chitosan Particles

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In the solution with pH>2, chitosan completely falls off from the surface of solid particles to form Fe_3O_4@SiO_2 + chitosan compound system. With the change of solution acidity and alkalinity, Fe_3O_4@SiO_2 has no obvious change with the change of solution acidity and alkalinity, but chitosan will change from chain segments to agglomerated nanoparticles after pH>pKa according to its own characteristics, as shown in Fig. S1.

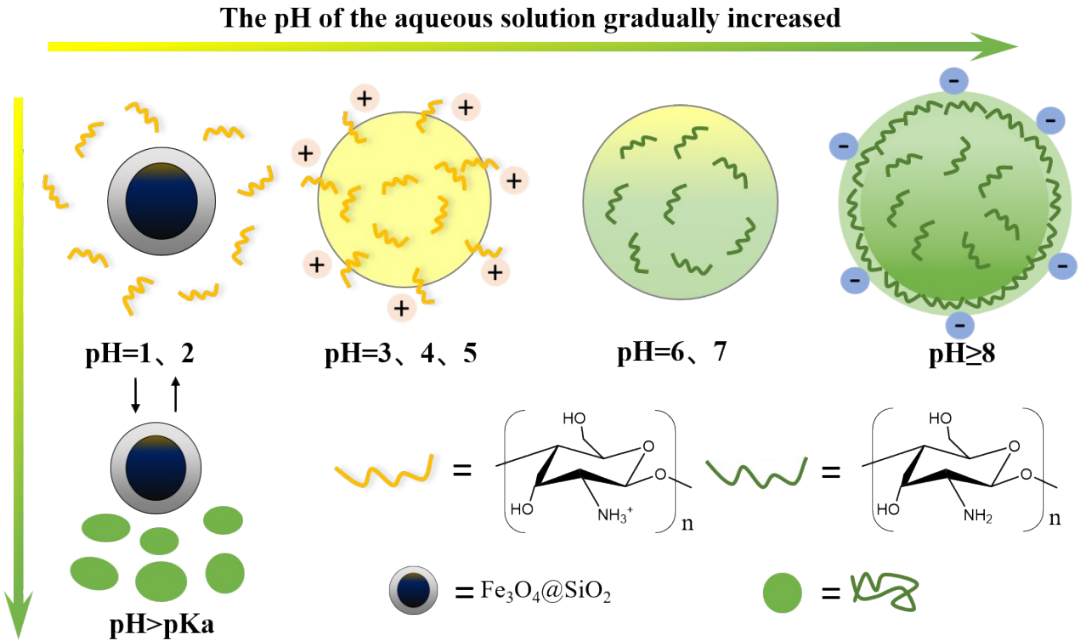

Fig.S1 Schematic representation of chitosan changes on Fe_3O_4@SiO_2@CS particles at different pH values (especially after pH=1 or 2) in aqueous solutions.

Fig. S2 shows the results of cyclic test from pH=2 to pH=12. It was evident that all formed stable emulsions and none of them respond magnetically to break emulsions. However, after the magnetic response in acidic conditions, most solid particles can still aggregate to one side under the action of a magnetic field, and the emulsion turns white; In neutral or alkaline conditions, emulsion droplets will move under a magnetic field without breaking emulsions. It was concluded that Pickering emulsions lost pH and magnetic responsive emulsions breaking ability.

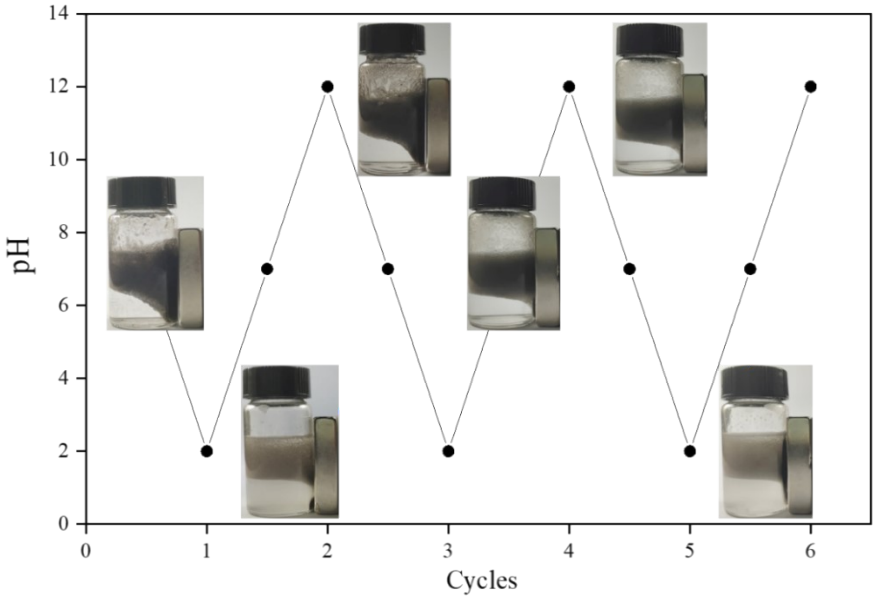

Figure.S2 Macroscopic images of emulsion cycling in response to changes in pH (2-12) and magnetic field.

In Fig S3 for an explanation of the cycling mechanism. In acidic conditions, the segments formed by the complete protonation of chitosan extended stretching in the aqueous phase because of the higher concentration of H^+ in the solution. It is used as a polymer to reduce the surface tension of the aqueous phase, plus $Fe_3O_4@SiO_2$ Solid particle stabilized emulsion; In neutral or alkaline conditions, the agglomerated chitosan nanoparticles with $Fe_3O_4@SiO_2$ Co action stabilizes emulsions. Even if a magnetic field is applied so that the particles leave the oil-water interface, the chitosan particles can still stabilize the interface independently.

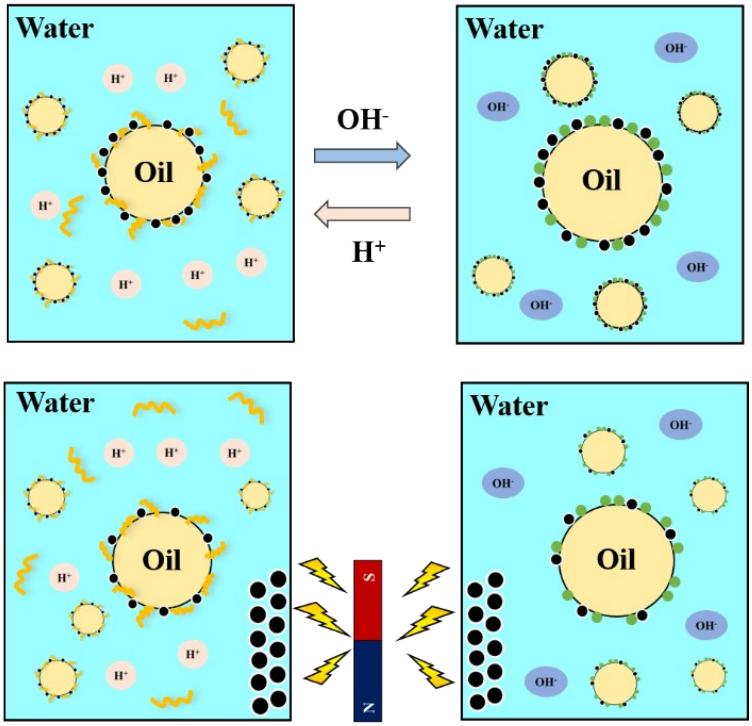

Figure. S3 Schematic illustration of the pH/magnetic dual responsive emulsification and demulsification mechanism of the Pickering emulsifier at pH 2-12.