Recipe for Magnetic Bubbles

Xue Zhao, Pedro A. Quinto-Su, and Claus-Dieter Ohl
Division of Physics and Applied Physics, School of Physical and Mathematical Sciences, Nanyang Technological University, Singapore 637371, Singapore.
(Dated: December 21, 2008)

The magnetic bubbles are prepared using a simple procedure that involves self assembly of magnetic nanoparticles: Magnetite nanoparticles were prepared in open air at room temperature. We added 4.2 mL of 1 M KOH aqueous solution to 25 mL of 0.1 M $FeCl_2$ aqueous solution. Then 250 μL of H_2O_2 3 wt.% aqueous solution was added into the solution to yield a black precipitate. The particles were separated by magnetic decantation, washed three times with 20 mL distilled water, two times with 20 mL acetone, and finally dried in air at room temperature. Presumably the structure of the nanoparticles [1] is an intermediate between Fe_3O_4 and γ-Fe_2O_3. 8 mg of the magnetic nanoparticles were washed with 4 mL ultrapure water once, dispersed in 4mL ultrapure water, and sonicated for ten minutes to obtain a uniform black solution. Next 500 μL of 5 mM of the surfactant sodium dodecyl sulfate (SDS) was added to 500 μL of the solution, and then shaken moderately for three minutes to form the magnetic bubbles.

---

1 Tada, M., Hatanaka, S., Sanbonsugi, H., Matsushita, N., Abe, M., J. Appl. Phys. **93** 7566-7568 (2003).