Size controlled magnetite nanoparticles and their drug loading ability

Thach C.V., Hai N.H., Chau N.

Center for Materials Science, Hanoi University of Science, 334 Nguyen Trai, Hanoi, Viet Nam

Abstract: Magnetite nanoparticles (MNPs) were synthesized by using coprecipitation method with a reaction between the $FeCl_2/FeCl_3$ solution and the ammonia water. The size of the MNPs could be controlled from 10.0 to 14.6 nm by changing the concentration of the solutes. The particles were superparamagnetic at room temperature. The saturation magnetization of the MNPs increased with increasing concentration of reactants. The magnetite nanoparticles were coated with a single layer of oleic acid (OA) to have a hydrophobic surface or with a double layer of oleic acid/sodium dodecyl sulfate (OA/SDS) to have hydrophilic surface. The coated particles could be dispersed in n-Hexane or water. The OA/SDS-coated nanoparticles were used to load an antibiotic drug, chloramphenicol (Cm). Three weight percent of Cm could be loaded onto the OA/SDS coated nanoparticles, which is much higher than amount that can be loaded using the traditional drug loading method.

Author Keywords: Biophysics; Drug delivery; Magnetic fluids; Magnetic nanoparticles; Magnetite

Year: 2008

Source title: Journal of the Korean Physical Society

Volume: 52

Issue: 5

Page : 1332-1335

Cited by: 4

Link: Scorpus Link

Correspondence Address: Thach, C. V.; Center for Materials Science, Hanoi University of Science, 334 Nguyen Trai, Hanoi, Viet Nam

ISSN: 3744884

Language of Original Document: English

Abbreviated Source Title: Journal of the Korean Physical Society

Document Type: Article

Source: Scopus

Authors with affiliations:

1. Thach, C.V., Center for Materials Science, Hanoi University of Science, 334 Nguyen Trai, Hanoi, Viet Nam
2. Hai, N.H., Center for Materials Science, Hanoi University of Science, 334 Nguyen Trai, Hanoi, Viet Nam
3. Chau, N., Center for Materials Science, Hanoi University of Science, 334 Nguyen Trai, Hanoi, Viet Nam

References:

1. D. L. Leslie-Pelecky, V. Labhasetwar and R. H. Kraus, Jr., Nanobiomagnetics, in Advanced Magnetic Nanostructures, edited by D. J. Sellmyer and R. S. Skomski (Kluwer, New York, 2005)Pankkhurst, Q.A., Connolly, J., Jones, S.K., Dobson, J., (2003) J. Phys. D: Appl. Phys, 36, pp. R167

2. Berger, P., Adelman, N.B., Beckman, K.J., Campbell, D.J., Ellis, A.B., Lisensky, G.C., (1999) J. Chem. Edu, 76, p. 943
3. Tartaj, P., Morales, M.P., Veintemillas-Verdaguer, S., Gonzalez-Carreno, T., Serna, C.J., (2003) J. Phys. D: Appl. Phys, 36, pp. R182
4. Jolivet, J.P., (2000) Metal Oxide Chemistry and Synthesis: From Solutions to Solid State, , Willey, New York
5. Jain, T.K., Morales, M.A., Sahoo, S.K., Leslie-Pelecky, D.L., Labhasetwar, V., (2005) Mol.Pharm, 2, p. 194
6. Khuat, N.T., Thach, C.V., Nguyen, V.A.T., Hai, N.H., Phan, T.N., Chau, N., J. Korean Phys. Soc, , in this issue