CD08

Immobilizing Trypsin on Magnetic Nanoparticles with Chitosan Coating

Doan Thi Kim Dung[1], Tran Hoang Hai[1]*, Le Hong Phuc[1], Bui Duc Long[1], Le Khanh Vinh[1], and Phan Nha Truc[2]

[1]Hochiminhcity Institute of Physics, Vietnam
[2]Can Tho University

A novel procedure was performed to immobilize trypsin on nanosized magnetic particles. Trypsin was immobilized on magnetic chitosan nanoparticles (MCP) after preparating MCP by the cross-lingking technique. Magnetic particles were functionalized at first by amine groups and the, they were functionalized with numerous aldehyde (-CHO) groups by treating the amine-functionalized magnetic nanoparticles with glutaraldehyde. Finally, immobilization of trypsin onto the aldehyde-functionalized magnetic nanoparticles was achieved through reaction of the aldehyde groups with amine groups of trypsin. The obtained trypsin-immobilized magnetic nanoparticles were conveniently applied for protein digestion. Cross-linking of trypsin and glutaraldehyde (GA) was confirmed by Fourier transform infrared (FTIR) spectra. Phase structure was determined by XRD, morphology was observed by TEM, SEM, and magnetic behaviors of these nanoparticles were analyzed by hysteresis loop of VSM. Results showed the GA concentration affected both the enzyme activity of the nanoparticle and particle size.

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CD09

Intrinsic Magnetism of Metal Free DNA

Young-Wan Kwon[1], Chang Hoon Lee[2], Dong Hoon Choi[1], Jung-Il Jin[1]*, and Eui-Kwan Koh[3]

[1]Department of Chemistry, Korea University, Seoul 136-701, Korea
[2]Department of Polymer Science & Engineering, Chosun University,Gwangju 501-753, Korea
[3]Korea Basic Science Institure-Seoul Branch, Korea University, Seoul 136-713, Korea

*Corresponding author: Jung-Il Jin, e-mail: jijin@korea.ac.kr

The first study on the intrinsic magnetic properties of DNA was reported based on electron paramagnetic resonance (EPR) spectroscopy in the end of 1950’s[1]. And Blois et al. [2] treated DNA with EDTA to exclude the effect of ferromagnetic impurities and then analyzed magnetic measurements. In 1961, Walsh et al. [3] observed iron oxides in DNA samples by electron microscopy and then the origin of magnetic properties of DNA was explained by ferromagnetic inclusion. Even more detailed studies were conducted by various researchers. However, the issue of whether the DNA magnetism was intrinsic or not was not satisfactorily resolved. Recently, we[4~6] reported on the intrinsic magnetic properties of A-DNA with ~30 ppm iron impurities and B-DNA by using EPR spectroscopy and SQUID measurement.

In this report, to understand the intrinsic magnetism of DNA clearly, we synthesized Fe(III)-DNA, composites of Fe_2O_3-DNA and metal free DNA. Metal free DNA was prepared with a chelating agent (EDTA, ethylenediaminetetraacetic acid). For each specimen, electron magnetic resonance (EMR) and SQUID magnetic measurements were carried out in the wide temperature ranges. And Metal contents in DNA was determined by ICP-MS and ICP-AES.

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