SYNTHESIS OF NEW HYDROXYL CONTAINING DIAZACROWN ETHER WITH AMIDE AND IRON NANOPARTICLES

Leyla Vezirova

Research Institute Geotechnological Problems of Oil, Gas and Chemistry, Az1010 Baku, Azerbaijan.

Synthesis of compounds of the supermolecular type is of interest for organic chemistry and biomedicine. Magnetic nanoparticles of iron oxides, in particular magnetite, in the last decade have been used in practice and biomedical research. The effectiveness of biomedical applications of nanomaterials ensures the introduction of organic functional ligands into the structure of the material. The synthesis of bifunctional organic compounds capable of binding to surface of nanoparticle and simultaneously containing biologically active fragments, is the actual problem. We synthesized the new diazacrown ether having amide groups in the macrocyclic ring by the two steps macrocyclization reaction. On the first step the reaction of 2-hydroxybenzoyl chloride N,N'-2,2-(ethane-1,2-diylbis(oxy))bis(ethan-1-amine) led to obtaining of corresponded bis-hydroxybenzamide N,N'-(ethane-1,2-diylbis(oxy))bis(ethane-2,1-diyl)bis(2-hydroxybenzamide). On the second step the cyclization of N,N'-(ethane-1,2-diylbis(oxy))bis(ethane-2,1-diyl)bis(2-hydroxybenzamide) with 1,3-dichloropropanol-2 led to obtaining of macrocycle. From synthesized macroheterocycles we can expect that the presence of the amide groups in the macrocyclic ring will serve for known ionophoric properties of crown ethers. Magnetic iron oxide nanoparticles (NPs) are prepared by wet chemical precipitation from aqueous iron salt solutions in alkaline milieu, created by using NH₄OH, in the atmosphere of gaseous nitrogen. The formed Fe₃O₄ NPs were separated by NdFeB permanent magnet, repeatedly washed with distilled water and dispersed in ethanol. The ethanol solution of MC, taken in excess, was added to ethanol solution of Fe₃O₄ NPs and vigorously stirred for 45 min. The obtained NPs were dried at ambient conditions, and the iron content in the samples was analyzed by atom absorption spectroscopy and performed on Varian SpectrAA 220FS Atomic absorption spectrometer. Samples were prepared by Milestone ETHOS 1 Microwave extraction unit. The binding of synthesized MC to Fe₃O₄ NPs occurs by means of non-covalent interactions of amide fragments of macrocyclic ring with the surface of magnetic NPs.

Keywords: diazacrown ether, amide groups, nanoparticles

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Presenting author's email: l_vel@mail.ru