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Sorbent for the separation of enantiomers of amino acids based on silica gel modified with stabilized Au nanoparticles

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Experimental part (Materials and Methods)

Equipment. The work was performed using a LC-10AT VP liquid chromatograph (Shimadzu, USA) equipped with a SPD-10AV VP diode array detector (Shimadzu, USA). The mobile phase was degassed before use on a Sapphire 6580 ultrasonic bath (Sapphire, Russia) operating at the frequency of 35 kHz and power of 60 W for 10 min. To obtain the microphotographs of gold nanoparticles, a LEO912 AB OMEGA transmission electron microscope (Cal Zeiss SMT AG Oberckochen, Germany) accelerating voltage of 100 kV was used. To obtain the micrographs of sorbents, a JEOL JSM-6390LA scanning electron microscope (JEOL, Japan) operating at the accelerating voltage of 20 kV was used. The diffuse reflectance spectra of synthesized sorbents were recorded on a CS-9001PC Dual-Wavelength Flying Spot Scanner (Shimadzu, Japan). A Nautilus E commercial chiral column (BioHimMak ST, Russia) doped with eremomycin was used for the comparison.

Reagents and solutions. MeCN (chromatography grade, Panreac, Spain), MeOH (chromatography grade, J.T.Baker, Netherlands), and $AcONH_4$ (pure grade) were used to prepare the mobile phases.

Solutions of the following substances were used: uridine, 5-methyluridine, 2-deoxyuridine, caffeine, theophylline, theobromine, tryptophan, phenylalanine, alanine, 4-chlorophenylalanine, methionine, and 3,4-dihydroxyphenylalanine (DOPA) (Sigma Aldrich, USA). These solutions were prepared by accurate weighting (500 μg ml^{-1}) in a $MeCN/H_2O$ mixture.

Synthesis of the sorbent. To obtain a new sorbent, the following chemicals were used: Kromasil silica gel (10 nm, 5 micrometers, Ekachemicals, Sweden), eromomycin hydrochloride provided by S. M. Staroverov (BioHimMak ST, Russia), gold(III) chloride tetra hydrate (*puris*).

Figures

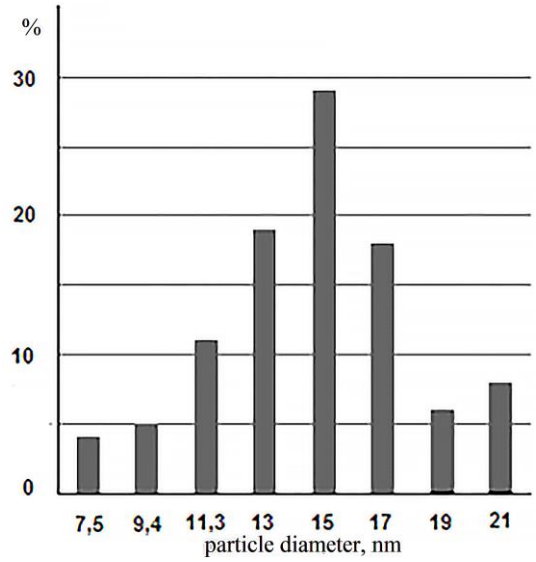

Figure S1 The GNP distribution by their sizes.

Figure S2 The map of GNP (the bright dots) distribution on the sorbent surface.

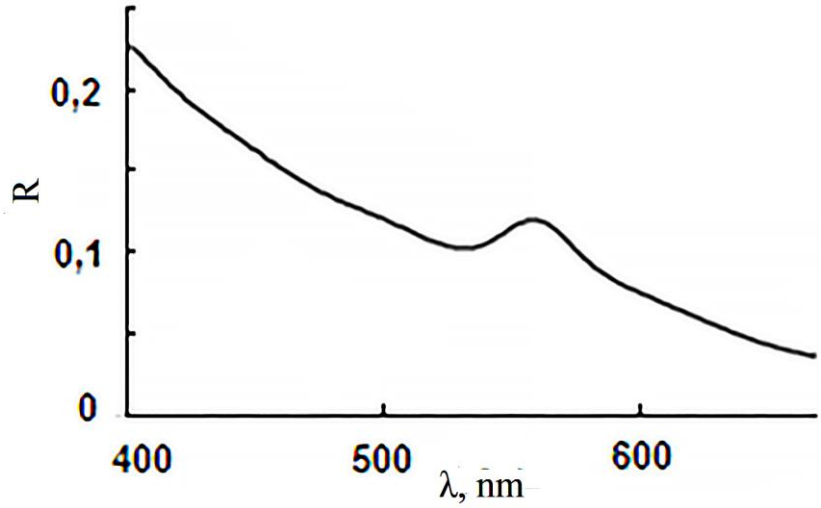

Figure S3 The diffuse reflection spectrum of the Kromasil-GNP-eremomycin sorbent.

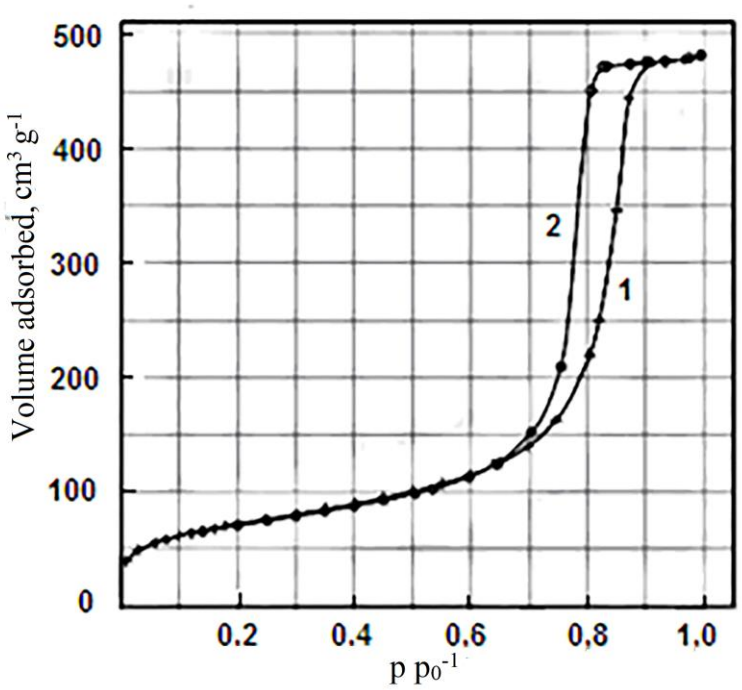

Figure S4 The isotherm plot for (*1*) adsorption and (*2*) desorption.

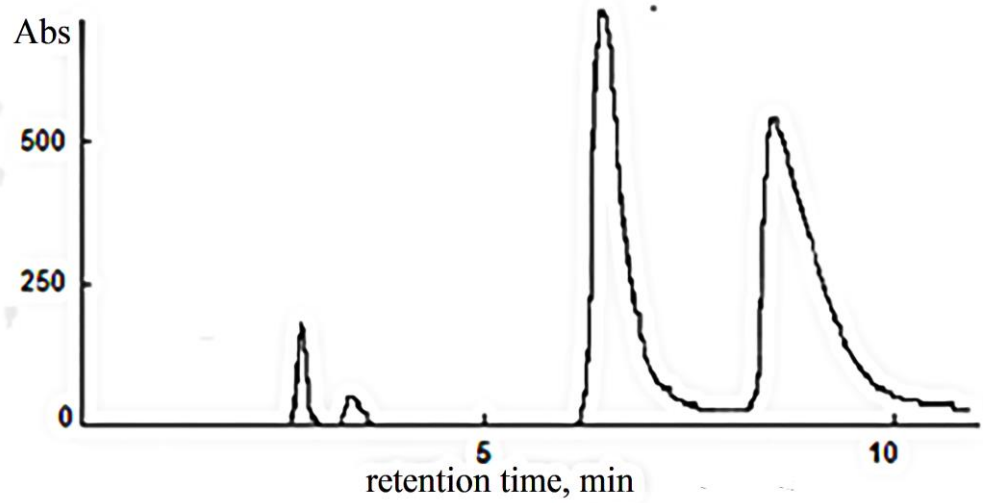

Figure S5 The chromatogram of racemic mixture of 4-chlorophenylalanine (the mobile phase was MeOH : H_2O in the ratio of 20 : 80). Flow was 0.5 ml min^{-1}; λ = 220 nm.