

Nanocomposites and nanomaterials

XPS investigation of tryptophan-stabilized Fe₃O₄/Ag nanoparticles

Pvlypchuk Ie.V.¹, Mukha Yu.P.¹, Vityuk N.V.¹, Kolodynska D.², Gorbyk P.P.¹

¹*Chuiko Institute of Surface Chemistry, NAS of Ukraine,
17 General Naumov Str., Kyiv 03680, Ukraine, ievgenpvlpchuk@gmail.com*

²*Faculty of Chemistry, Maria Curie-Skłodowska University, pl. Maria Curie-Skłodowskiej 3, 2 031 Lublin, Poland.*

An approach for synthesis stable monometallic silver nanoparticles in aqueous solution in the presence of essential amino acid tryptophan described in [1], was used for preparation of Fe₃O₄/Ag complex nanoobjects.

Surface of Fe₃O₄/Ag nanoparticles was investigated by X-ray photoelectron spectroscopy (XPS). XPS spectra for Ag 3d-levels presented at fig.1.

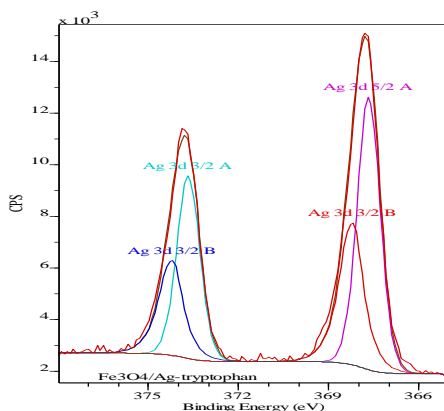


Fig. 1. XPS spectra for Ag 3d-levels.

From XPS data we can conclude that 37.5% of silver is in the zero oxidation state, that meets the metallic silver clusters on the magnetite surface. At the same time, 62.5% of silver is in the oxidation state +1 (ionic form), and can be caused by incomplete reduction of Ag⁺ and/or partial oxidation of Ag clusters.

1. Iu. Mukha, N. Vityuk, O. Severynovska, A. Eremenko, N. Smirnova, The pH-dependent structure and properties of Au and Ag nanoparticles produced by tryptophan reduction // *Nanoscale Research Letters* (2016) **11**:101.