

Modified Silica Gel with 5-Amino- 1, 3, 4 - Thiadiazole -2-Thiol for Heavy Metal Ions Removal

P. Tzvetkova, P.Vassileva, R.Nickolov

Institute of General and Inorganic Chemistry, Bulgarian Academy of Sciences, 1113 Sofia,

Bulgaria, *E-mail*: ptzvetkova@svr.igic.bas.bg

Heavy metals presented in industrial wastewater, such as Cd(II), Pb(II), Cu(II), Co(II), Ni(II) and Hg(II) are hazardous to the aquatic ecosystem, which have posed possible human health risk. In recent years there is a trend to use surface modified inorganic supports.. In this way, new low-cost selective sorbents, which are effective catalysts and polymer fillers, have been obtained. Silica gels have a wide application as inorganic supports .The two sorbents was to synthesize for heavy metals removal: silica gel modified with 5-amino- 1, 3, 4 - thitadiazole 2-thiol (S5A) and pure silica gel. Modification of silica gel is achieved by tetraethyl orthosilicate (TEOS) preliminary hydrolyzed at room temperature. 5-amino-1, 3, 4-thiadiazole--2-thiol is added, with continuous stirring with a magnetic stirrer, to the hydrolyzed TEOS. Pure silica gel (sample SG) is obtained by the classical sol gel method using the same conditions and initial component ratios. The sorbents have been characterized as to their surface area, pore volumes, content of the functional groups, IR spectra, sulfur and nitrogen content. Their sorption properties to heavy (Cu (II), Co (II), Ni(II), Cd(II), Pb(II) and Hg(II) metals are investigated.. The investigations indicate that modified silica gel is characterized by a relatively higher sorption capacity than is the unmodified one. The highest sorption capacity belongs to Hg (II) in presence of unmodified silica gel due to which this sorbent can be used for selective extraction of mercury ions from aqueous solutions.