

COLORIMETRIC DETERMINATION OF Pd(II), Rh(III), Ru(IV) ON THE SURFACE OF SILICA GEL CHEMICALLY MODIFIED WITH THIOUREA GROUPS

We investigated the conditions of palladium (II), rhodium (III) and ruthenium (IV) quantitative removal on the surface of silica gel chemically modified by thiourea groups (TUS). Time to establish sorption equilibrium for palladium (II) is 30 minutes at room temperature. Rhodium (III) and ruthenium (IV) are quantitatively removed only when heated to 95°C during 3–4 hours. The sorption process of precious metals was carried out in an acidic medium. The colored compounds color characteristics of listed precious metals were studied on the TUS surface using an office scanner and software digital image processing. Adsorbates of palladium (II) and rhodium (III) are stained in yellow color, and adsorbates of ruthenium (IV) have gray color. The dependence of color characteristics intensity from the metal concentration has an exponential character. The lower limit of detection is about 1 mkg / 0,1 g of sorbent. Such method has a good sensitivity and reproducibility. The performed research show perspective of colorimetry using, as an express, cheap and available method of further palladium (II), rhodium (III) and ruthenium (IV) definition in a phase of TUS sorbent, that can be used in their laboratory express analysis. For comparison the similar studies were carried out with determination of precious metals adsorbed on the surface of silica gel with the help of diffuse reflectance spectroscopy (DRS). There is no linear relationship at low concentrations in DRS. The lower limit of detection is about 20 mkg / 0,1 g.

Keywords: colorimetry, silica gels, noble metals.