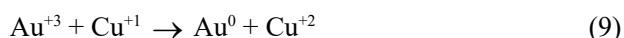
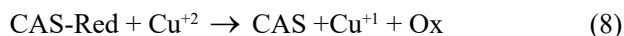


In presence of copper (II) salts the reactions proceeding refer to:



In fact the rapid gold (III) ions reduction by iron (II) ions is widely used as an analytical method for gold determination [28]. The sorption capacity of CAS-2 in respect to gold (III) ions is determined. CAS-2 with a particle diameter of 0.4 mm is used to find its static and dynamic capacity in the case studied. The static capacity is determined following the procedure: a solution of gold ions is poured onto a sample of the sorbent with a certain mass and left for 96 h. The ions residual amount in the solution is determined by photometric titration with a Mohr's salt solution. The amount of the adsorbed gold ions is calculated by the formula:

$$M_{\text{Au}} = Q - V \cdot N \cdot 65.67 \quad (10)$$

where M is the quantity (mg) of adsorbed gold, Q is the initial quantity (mg) of gold (III) ions in solution, V (ml) is the the volume of Mohr's salt consumed in the titration, N is the normality (n) of Mohr's salt, while 65.67 stands for the molar mass of the gold equivalent.

The dynamic capacity of the sorbent, i.e. the capacitance prior to the breakthrough of the gold ions into the solution is determined following the procedure described above. The experimental results show that the static capacity (a capacity referring to the complete saturation of the sorbent with gold) of CAS-2 is equal to 226.2 mg g⁻¹, while its dynamic capacity amounts to 86.6 mg g⁻¹. Thus, one can see that the static adsorption capacity of the sorbent studied is greater than its dynamic adsorption capacity.

CONCLUSIONS

Thus, it can be summarized that the carbon sorbents of the CAS brand have low oxidation-reduction potentials ranging from 0.20V to 0.25V (Ag/AgCl in a saturated KCl solution) as reducing sorbents in relation to gold (III) ions in a hydrochloric acid medium. Metallic gold is extracted on the surface of these sorbents during the sorption studied. It does not occur evenly on the entire surface of the sorbent granules but in certain areas. It

follows that the metallic gold extraction and the oxidation of the sorbent reducing groups are electrochemical processes, i.e. there are cathodic and anodic sites. The cathodic sites where the gold (III) ions reduction proceeds are formed at the initial moment of the sorption.

CAS-2 sorbent possesses the best kinetic and adsorption properties. The quantitative recovery (99 % - 100 %) of gold (III) ions from a chloride medium occurs within 8 min regardless of the initial ions content in the solution within the studied concentration range (8.88 mg l⁻¹-35.5 mg l⁻¹).

The static capacity of CAS-2 in respect to gold ions equals 22.62 mg g⁻¹, while the dynamic capacity amounts to 86.6 mg g⁻¹. The presence of significant amounts of metal ions, such as cobalt, cadmium, zinc, platinum, arsenic one does not impede the sorption process. The rate of gold (III) ions sorption increases in the presence of copper (II) and iron (III) salts due to a catalytic effect.

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