Functional Materials 10, No.4 (2003) 

# Solid phase spectrophotometric determination of copper (II) using SPADNS

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*Received July 23, 2002*

Anion-exchange resin modified with 2-(4'-sulfobenzeneazo)chromotropic acid was used for concentration and subsequent determination of copper (II) microscale amounts in large-volume samples of drinking water. The chemistry of copper complexing with 2-(4'-sulfobenzeneazo)chromotropic acid in solid phase has been considered. Quantitative characteristics of the compound composition and stability have been obtained.

Анионит, модифицированный 2-(4-сульфобензолазо) хромотроповой кислотой, использован для концентрирования и последующего определения микроколичества меди (II) в больших объемах проб питьевой воды. Рассмотрен химизм комплексообразования меди с 2-(4-сульфобензолазо) хромотроповой кислотой в твердой фазе. Получены количественные характеристики состава и прочности образующегося соединения.

The use of ion-exchanging functional materials makes it possible to solve various problems associated with industrial applications of closed technologic circuits and complex use of raw materials.

In recent time, the information on applications of ion-exchanging materials modified with various organic reagents became very abundant. These reagents made it possible to develop novel high-sensitive procedures to determine trace amounts of heavy metals in numerous objects. A plentiful information on photometric Cu(II) determination procedures in solutions is presented in [1]. However, all these procedures provide for preliminary concentration of Cu(II) micro-amounts using toxic organic extracting agents. Moreover, most of those procedures are low-selective.

On the other hand, to determine the micro-amounts of Cu(II) in water, evaporation or extraction of large-volume samples is used [2, 3], thus complicating the analysis significantly. Therefore, a method combining sorption of traces of the elements to be determined from large volumes of solutions followed by their simple photometric determination directly in solid phase is highly urgent. There are data [4] on solid-phase spectrophotometric (TPS) determination of copper; those data are presented in Table 1.

The copper detection thresholds using the above-mentioned procedures are not low enough. The 2-(4'-sulfobenzeneazo)chromotropic acid (SPADNS) did not used to date as a modifier for the AV-17-8 anion-exchange resin.

The stock 0.1 M solution of $Cu(NO_3)_2$ was prepared by dissolving a precise weight of the salt in 1 M $HNO_3$. The solution was standardized using iodometry. The working solution ($1.6 \cdot 10^{-3}$ M) was prepared by diluting the above stock solution.

The AV-17-8 with linear grain dimensions of 0.25 to 0.50 mm was used that was pre-treated as described in [5]. 10 g of AV-17-8 were soaked in water for 1 day. Then the water was decanted, the sorbent was placed in a column, washed with 150 ml of 0.1 M NaOH during 6 h and then washed with water until neutral. Then the sorbent was transferred into a beaker, 200 ml 0f