The main objective was to obtain good adsorption performance towards germanium. Another important feature is the separation of gallium from germanium to find best conditions for separation of the pair elements.

The radioactive tracer technique was used for determination of the distributions coefficients ($K_D$). Both $^{77}Ge$ and $^{72}Ga$ radionuclides were produced by irradiation of pure metals in WWR-SM nuclear reactor at a thermal neutron flux of $5 \times 10^{13}$ n/cm$^2$/s for 20-24 hours. The dissolution of the metal tin in concentrated nitric acid was used for preparation of $\beta$-$SnO_2$. It is shown that the adsorption properties of $\beta$-$SnO_2$ greatly depended on conditions of treatment after dissolution of tin. Extremely high distribution coefficients for $^{77}Ge$ radionuclide and the more high separation factor of Ge-Ga were achieved in 1 M HCl for $\beta$-$SnO_2$ sample dried at 180-200 °C. Adsorption of germanium was quantitative (99.5-99.7 %) from hydrochloric acid solutions (0.1-1.4 M). The dynamic capacity before the breakthrough of germanium was 20 mg of Ge per gram of $\beta$-$SnO_2$.

The obtained adsorbent $\beta$-$SnO_2$ was tested for separation of $^{68}Ge$-$^{68}Ga$ radionuclide chain. The optimal separation of the daughter $^{68}Ga$ from parent $^{68}Ge$ can be achieved by using 1 M HCl as eluent. It is shown that the tin dioxide – 1 M HCl generator system provides high yields of $^{68}Ga$ (75-80%) with low levels of breakthrough of $^{68}Ge$ ($2 \times 10^{-4}$%).


# SEPARATION AND PURIFICATION OF CARRIER-FREE COBALT-58 FROM NEUTRON IRRADIATED NICKEL FOIL FOR ELECTROCHEMICAL STUDIES

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Cobalt-58 will be used for tracer studies of the behaviour of cobalt radionuclides in no-carrier-added form during electrochemical deposition on metal backing. The $^{58}Co$ can be produced by using $^{58}Ni(n,p)$ $^{58}Co$ nuclear reaction in nuclear reactor. $^{58}Co$ ($T_{1/2}$=71 days) decays by positron emitting (15%) and electron capture (85%) with simultaneous $\gamma$-irradiation.

In this study, we have developed the simple method for separation and purification of $^{58}Co$ in no- carrier-added form from neutron irradiated nickel foil.

Previously, we have studied the dissolution of nickel foil in various media to find best conditions for rapid dissolution of nickel target. It was found that nickel foil dissolved completely without heating in 6.3 M hydrobromic acid with addition a few drops of hydrogen peroxide. After dissolution of the target material, the cobalt-58 is separated from nickel, copper, iron and other elements by extraction chromatography. The solution in 6.3 M

hydrobromic acid is passed through a column containing suspension of polytetrafluoroethylene powder with 0.5 M trioctylamine in xylene, equilibrated with the same acid. Nickel is not extracted and passed through column. Cobalt is retained and finally eluted with 3 M HBr in the one free column volume. The cobalt fraction is percolated through a column filled with suspension of pure polytetrafluoroethylene powder to purify from the admixture of extractant. The obtained solution is evaporated to dryness and the dry residue is treated by evaporation with aqua regia. After treatment the damp residue is dissolved in electrolyte and the obtained solution is used to study of $^{58}Co$ electrochemical deposition procedure.

The yield of cobalt-58 was higher than 93% and the radiochemical purity was more than 99%. This method will be used for separation and purification of cobalt-57 to make of sealed sources for X-ray fluorescence analysis.


# EXTRACTION OF $^{198}Au$ BY PHOSPHORILIZED DERIVATIVES OF BISMUTHION-1

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Apart from dithiophosphates, which are quite widely investigated as extragents of noble metals, only a few compounds with thiophosphorile group (P=O and P=S) are tested as metal extragents, although among them selective extragents of noble metals have also been found. So to find effective extragents of gold ions we synthesized phosphorilized derivatives of 2,5-dimercapto-1,3,4-thiadiasole (vismuthon-1).Structure of compounds agrees with spectral data.

In the PMR spectrum of 2,5-dimercapto-di-bis-(O,O-hexylphosphato)-1,3,4-thiadazole at 3,96 p.m. quartet of protons of oxymethylene group(O-$CH_2$) with spin-spin interaction constant of $J_{P\text{-}O\text{-}CH}=J_{HC\text{-}CH}$-6,9 Hz.

In region 1,9-1,1 m.g. eight protons of $CH_2$-group make up a multiplet and at 0,95 p.m. triplet - of metyl -group.

Extraction of gold ions by obtained compound is investigated using $^{198}Au$ radionuclide. Structure of compounds (R=$C_2H_5$-$C_8H_{17}$, i-$C_3H_7$,i-$C_4H_9$), affect the effectivity of extraction nature (HCl, $H_2SO_4$, $HNO_3$) and concentration of acid (see table 1).