und wäscht mit höchstens 5 ml Wasser nach. Das Kobalt(II)-sulfid scheidet sich in einer deutlich sichtbaren, schwarzgefärbten, scharfen Zone quantitativ ab.

Nach maximal 7 min kann der das Strontium, Barium und Caesium enthaltende Effluent in der üblichen Weise weiter verarbeitet werden [3].

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Potassium Benzenesulphonyl Dithiocarbamate as a New Reagent for the Photometric Microdetermination of Cobalt(II)

Kaliumbenzolsulfonyl-dithiocarbamidat als neues Reagens zur photometrischen Mikrobestimmung von Kobalt(II)

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In the past, several attempts have been made to obtain specificity in the complex formation tendency of dithiocarbamates by molecular modifications [1]. In view of that potassium benzenesulphonyl dithiocarbamate with the following formula was prepared.

A mixture of 10 g of benzenesulphonamide, 4 g of potassium hydroxide and 50 ml of carbon disulphide was refluxed for 6 h. The carbon disulphide was decanted off the cooled mixture and the red-orange solid triturated twice with acetone and then with alcohol. The dried solid was recrystallized from hot alcohol; m.p. 310°C (*d.*).

The reagent is soluble in water and forms coloured, soluble complexes with Fe(II), Fe(III), Co(II), Ni(II), Cu(II), and UO₂(II); it gives precipitates with Ag(I), Hg(II), Pb(II), Pd(II), Sn(II), Sn(IV), Sb(III),

Bi(III), Au(III), and As(III). The precipitates are not stable enough to offer any possibility of gravimetric estimation. The coloured cobalt(II) complex is stable enough to time and temperature to be explored for colorimetric estimation.

The reagent reacts with cobalt(II) from pH 1.0 to 9.25 to form a green, soluble 1:2 (cobalt/ligand) complex. The stoichiometric composition of the complex was further confirmed by carrying out amperometric titration at -1.6 V vs. S.C.E. Excess reagent has negligible effect on colour intensity. The reaction can be used for the spectrophotometric determination of cobalt(II) at 640 nm. Beer's law is obeyed over the concentration range of 30 to 140 ppm of cobalt(II). The stability constant of the complex is 1.392×10^{11} and Sandell's spectrophotometric sensitivity is 0.0815 $\mu\text{g}/\text{cm}^2$. Five-fold excess of the reagent is required for full colouration.

Cu(II), Pb(II), Ni(II), Bi(III), Au(III), CN⁻, EDTA, SO₃²⁻, S²⁻, S₂O₃²⁻ and BO₃³⁻ interfere. No interference has been found due to the presence of: Ca(II), Sr(II), Ba(II), Mn(II), Zn(II), Al(III), Cr(III), In(III), Ga(III), Sm(III), La(III), Ce(IV), Th(IV), V(V), and Mo(VI). Interferences caused by the following cations can be eliminated by the addition of the reagents given in parenthesis: Fe(II) and Fe(III) (ascorbic acid); Ag(I), UO₂(II), Pd(II), Hg(II), Sn(II), Sb(III), and Sn(IV) (sodium oxalate); As(III) (sodium citrate or sodium tartrate).

The liquid-liquid extraction behaviour of the complex was studied by employing ⁵⁸Co as tracer. Out of the commonly employed organic solvents, the complex extracts only in amyl acetate from pH 1.0 to 9.0. No effect of pH was observed on extraction the percent extraction remaining almost constant (87.90) in this range.

The cobalt complex was titrated against EDTA (disodium salt) solution at room temperature in the pH range 1.0 to 9.0. The colour change at the end point was from green to colourless. The concentration range which could be conveniently determined was from 2×10^{-2} M to 1.25×10^{-2} M cobalt(II) solution. Cu(II), Ni(II), Pb(II), Bi(III) and Au(III) interfere.

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