



USE OF SOLID ELECTRODES FOR POTENTIOMETRIC DETERMINATION OF METALS

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Solid indicator electrodes are widely used for potentiometric analysis. These electrodes are chemically stable to electrolytes. A sharp potential jump arises at their equivalence point. A number of metallic electrodes (Mo, W, Te, Sb, Pb, Al, Cu, Ag) was investigated to make clear their usability for potentiometric determination of Itrium and Scandium with cuppheron and Potassium salt of benzohydroxamic acid.

It was established that only W, Mo, Te and Sb can be used for indicator electrodes. The jumps of these electrodes potentials are higher than at other ones and well reproduced by retitration. These electrodes potentials assume the constant value rather rapidly (for 1-3 minutes) and one potential jump appears on the potentiometric titration curve. (E/V 400-800) that indicates the formation of a single chemical compound. The results of calculations showed Itrium and Scandium quantities were determined with high precision. So, in the range between 1.0 and 25.0 mg a relative error doesn't exceed 2.5%.

While studying the medium pH effect on the precision of Itrium and Scandium potentiometric determination, the pH limits were established in which these ions are titrated (for Itrium pH=3.60-5.50, for Scandium pH=3.50-4.50. The effect of dilution, temperature and intermixing speed of the analysed solution were taken into consideration as optimal conditions for Itrium and Scandium titration. The optimal conditions for the experiments are: the dilution of the analysed solution aliquot up to 25-50 ml (1.025.0 mg) at t 10 - 40 C and the solution intermixing speed from 250 to 500 r.p.m.

The current titration was conducted to increase the determination sensitivity. The direct current (2-4 mca) is supplied to the electrodes that is quite enough to make the titration curves more distinct. The current potentiometric titration speeds up the establishment of balanced potentials by titration and causes a sharp potential jump at the equivalence point (1.2 - 2 times). This leads to an increase of the determination sensitivity, the number of analysed elements being reduced.

Thus, the methodics of Itrium and Scandium potentiometric determination with cuppheron and Potassium salt of benzohydroxamic acid and W, Mo, Te, Sb indicator electrodes was developed. The method of current potentiometric titration using a polarized electrode is more advantageous in comparison with classic potentiometric titration.