Turkish Journal of Chemistry

Turkish Journal

of

Chemistry

Determination of trace borohydride in basic solutions using differential pulse polarography

Ülkü ÜNAL and Güler SOMER
Gazi University, Chemistry Department, 06500 Ankara-TURKEY
e-mail: gsomer@gazi.edu.tr

Keywords
Authors

chem@tubitak.gov.tr

Scientific Journals Home Page

Abstract: Synthesis of borohydride is important because of its use as a hydrogen energy source. The objective of this study was to develop a new and simple method for the trace determination of borohydride so that it can be used during the investigation of a new reaction for its synthesis or in some kinetic studies. A differential pulse polarographic method has been developed for this purpose since the results obtained with this method are very reproducible and the instrument used is not expensive. The optimum working condition was found to be as 0.05 M phosphate buffer (pH 9), containing 0.1 M KNO_3 electrolyte. It allows trace determination of borohydride in the range of 10^{-4}-10^{-6} M using the oxidation peak at --0.06 V with high accuracy. The detection limit was 6 \times 10^{-7} M in phosphate buffer. The nature of the peak was evaluated using direct current polarography and it was found that this peak at --0.06 V was an oxidation peak. There was no serious interference from some cations such as Cr(III), Cr (VI), Fe(III), Cd(II), Pb(II), Zn(II), Ni(II), and Se(IV) and anions such as chloride, bromide, nitrate, and sulfite when 2-14 times of borohydride was present. It was found that only copper (II) had an overlapping peak. This interference of copper was eliminated by the addition of EDTA. Using this procedure, in the presence of 5 \times 10^{-5} M copper, for 2 \times 10^{-5} M borohydride the result found was (1.9 \pm 0.2)10^{-5} M for N = 3 and 90% confidence interval.

Key Words: Trace borohydride, etermination, ifferential pulse polarography, opper interference.

Turk. J. Chem., **33**, (2009), 657-665.
Full text: pdf
Other articles published in the same issue: Turk. J. Chem.,vol.33,iss.5.