Use of the Silicone Grease-based Copper Responsing Electrode

B. S. SHARMA, A. K. GURTU AND Dr. B. R. AGARWAL*

Chemistry Department, B. S. A. College, Mathura-681 004.

*Vice-Chancellor, C. S. A. University of Agriculture and Technolngy, Kanpur-208 002.

THE silicone grease-based Copper responsing electrode has been found to be suitable at pH values 6.5 and 4 using calibration curves. At pH 6, however, it gives perfect Nernstian slope Value. Temperature coefficient of the electrode potential has also been determined.

IN our previous communication[1] we have reported that by mixing mercuric sulphide and cupric sulphide in non-reactirg silicone grease, a Copper ion responsing electrode can be prepared. The present communication is devoted for the determination of pH and temperature coefficient of the electrode potential.

EXPERIMENTAL

The electrode was prepared as described in the previous communication[1]. Temperatures below room temperature were maintained as described by Chakrabarti[2]. PL 52 Toshniwal potentiometer with BG 11 Ballestic galvanometer and lamp and scales arrangement was used for emf. determination of the copper responsing electrode vs sce. A clear copper sulphate solution could not be made at pH 7. Buffers for pH 3, 4 and 5 values were made by mixing sodium acetate and acetic acid while for pH 6, Potassium dihydrogen phosphate and borax solutions were used.

RESULTS AND DISCUSSIONS

The electrode potential of the copper responsing electrode was studied as function of log cupric ion concentration at pH 6, 5, 4 and 3. Data have been plotted in figure (1). The electrode response is linear in the case of pH 6, 5 and 4 while in the case of pH 3 the readings could not be obtained. The slope values of the lines at various pH values Vs pH of the medium are shown in Table (1).

A glance at the table indicates that the Nernstain slope value is obtained in the case of medium at pH 6, while in case of pH 5 the slope value is slightly decreased. However, at pH 4 the value is very greatly decreased although maintaining the reproducibility of the data. Beyond this pH range electrode fails to respond.

The electrode potential has also been studied. The data has been ploted in figure (2). The temperature dependence of the electrode potential has been calculated to be 1.5×10^{-3} volt per degree.

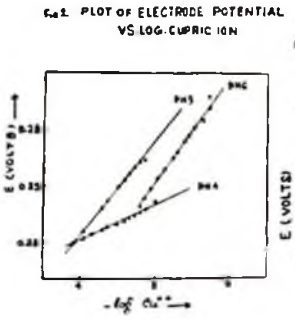


Fig. 1

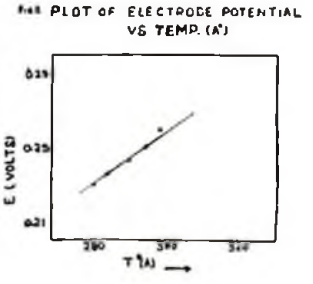


Fig. 2

TABLE 1

Slope values Vs pH of the medium in the case of responsing electrode

Sl. No.	pH	Slope values
1	7	No response
2	6	0.029
3	5	0.025
4	4	0.01
5	3	No response

Further work is in progress to use this electrode as an end point detector in titrations of cupric ions with thio-compounds like thio-urea, thio-acetamide, diethyl di thio carbamate, thio-semi-cabazude, rubeanic acid etc.

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