DOI: https://doi.org/10.15407/techned2016.06.076

EXPERIMENTAL RESEARCHES OF IMPEDANCE OF CONDUCTOMETRIC INTERFACE Pt/H_2O AND Pt/KCl ON FREQUENCIES 10 kHz – 1 MHz

Journal	Tekhnichna elektrodynamika
Publisher	Institute of Electrodynamics National Academy of Science of Ukraine
ISSN	1607-7970 (print), 2218-1903 (online)
Issue	№ 6, 2016 (November/December)
Pages	76 – 82

Authors
A.A.Mikhal, D.V.Meleshchuk, I.N.Grebenkov
Institute of Electrodynamics National Academy of Science of Ukraine,
pr. Peremohy, 56, Kyiv-57, 03680, Ukraine,
e-mail: a_mikhal@ukr.net, mdimav@ied.org.ua

Abstract

The electric model is investigated as a simplified threeelementary chart of substitution of interfacial area of metallic electrode – conductive liquid (interface). The results of experimental researches of constituents of impedance are presented in the range of frequencies higher 10 kHz for two types of conductometry interface of Pt/H_2O and Pt/KCl. The change of two-element chart of substituting for a cell with successive on a parallel chart depending on working frequency and permittivity of solution is proved. Dependence of pure resistance of cell with solution from frequency is investigated. In theory it is set and experimentally proved that the slump of frequency dependence is conditioned by the presence of currents of displacement in low-mineralized solutions. For the calculation of frequency of slump it is possible to use not only

the parameters of volumetric impedance (resistance and capacity) but also parameters of environment (electrolytic conductivity and inductivity).
References 9, figures 5, table 1.

Key words: measuring, conductometry, electric model, permittivity.

Received: 10.11.2015
Accepted: 08.09.2016
Published: 27.10.2016

References

1. Dziadevych S.V., Soldatkin O.P. Scientific and technological grounds for creating miniature electrochemical biosensors . Kyiv: Naukova dumka, 2006. 255 p. (Ukr)
2. Iossel Yu.Ya., Kochanov E.S., Strunskiy M.G. Calculation of capacitance. Leningrad: Energoizdat, 1981. 288 p. (Rus)
3. Melnyk V.G., Dziadevych S.V., Ivashchuk A.V., Ulianova V.A., Lepykh Ya.I., Romanov V.A. Experimental researches of microelectronic sensors for the conductometry biosensory systems. *Sensorna elektronika i mikroskhemni tekhnolohii* . 2011. Vol. 2(8). No 3. P. 81 – 90. (Rus)
4. Bard A.J., Faulkner L.R. Electrochemical methods. Fundamentals and applications. John Wiley & Sons, 2001. 833 p.
5. Bottauscio O., Carpa P.P., Durbiano F., Manzin A. Modeling of Cells for Electrolytic Conductivity Measurements. *IEEE Transaction on Magnetics* . 2006. Vol. 42. No 4. P. 1423 – 1426. DOI: https://doi.org/10.1109/TMAG.2006.871443
6. Brett C., Brett A. Electrochemistry. Principles, Methods and Applications. Oxford University

Press, 1994. 427 p.
7. Langereis G.R. An integrated sensor system for monitoring washing processes. Copyright © 1999, G.R. Langereis.
8. Máriássy M., Pratt K.W., Spitzer P. Major applications of electrochemical techniques at national metrology institutes. *Metrologiia*. 2009. No 46. P. 199–213.
9. Xiaoping S., Spitzer P., Sudmeier U. Novel method for bulk resistance evaluation in conductivity measurement for high-purity water. *Accred Qual Assur.* 2007. No 12. P. 351 – 355.

PDF