New sensor based on AgCl containing Iron Oxide or Zinc Oxide Nanoparticles for Chloride Determination

Ante Prkić^{1,*}, Tina Vukušić², Ivana Mitar³, Josipa Giljanović¹, Vesna Sokol⁴, Perica Bošković³,
Miće Jakić⁵, Andrea Sedlar¹

¹ Department of Analytical Chemistry, Faculty of Chemistry and Technology, University of Split, Ruđer Bošković 35, 21000 Split, Croatia.

² Faculty of Chemistry and Technology, University of Split, Ruđer Bošković 35, 21000 Split, Croatia.

³ Department of Chemistry, Faculty of Science, University of Split, Ruđer Bošković 33, 21000 Split, Croatia.

⁴ Department of Physical Chemistry, Faculty of Chemistry and Technology, University of Split, Ruđer Bošković 35, 21000 Split, Croatia.

⁵ Department of Organic Technology, Faculty of Chemistry and Technology, University of Split, Ruđer Bošković 35, 21000 Split, Croatia.

*E-mail: prkic@ktf-split.hr

doi: 10.20964/2019.01.71

Received: 13 September 2018 / Accepted: 23 October 2018 / Published: 30 November 2018

This work describes preparation and application of “homemade” chloride ISE enriched with iron oxides or zinc oxide nanoparticles. The prepared chloride ISE membrane was made of AgCl:Ag₂S:PTFE = 1:1:2 and AgCl:Ag₂S:PTFE = 2:1:2 enriched with mentioned nanoparticles in ratio 0.5-1.2 wt.%. Prepared membranes were used for chloride determination in perchloric acid (pH = 0-2) and acetic buffer (pH = 4 – 4.75). Due to the low method price, simplicity and a reasonably fast way of usage, it was considered as a possibility for chloride determination in high acid media. Two of prepared membranes (M1 and M4) have shown best characteristics. M1 showed linear response range for chloride between 2.0×10^{-6} and 1×10^{-1} mol L⁻¹, with a detection limit of 2.24×10^{-6} mol L⁻¹ and potential change of 44.39 mV per decade. M4 showed linear response range for chloride between 4.2×10^{-6} to 1×10^{-1} mol L⁻¹, limit of detection of 1.39×10^{-6} mol L⁻¹ with potential change of 24.79 mV per decade at pH = 0.

Keywords: chloride, potentiometric, determination, “homemade” ion-selective electrode, nanoparticles

[FULL TEXT](#)

© 2019 The Authors. Published by ESG (www.electrochemsci.org). This article is an open access article distributed under the terms and conditions of the Creative Commons Attribution license (<http://creativecommons.org/licenses/by/4.0/>).