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Chloride-Selective Membranes Prepared with Different Matrices Including Polymers Obtained by Sol-Gel Method

박성배
인제대학교 화학과

A novel organic-inorganic hybrid sol-gel matrix could be used as host for a quaternary ammonium salt, tridodecylmethylammonium chloride (TDMAC). The membrane electrodes showed a much improved selectivity toward chloride over salicylate and other lipophilic anions. If an ionophore in an anion-selective membrane is of an ion-exchanger type (e.g., TDMAC), the anion selectivity will be dictated by the ratio of partition coefficients of primary and interfering anions in the sample solution. This results in the so-called Hofmeister selectivity pattern, showing more responses toward more lipophilic anions. In case of a chloride sensor, a large and organic anion such as perchlorate and salicylate can give a significant positive error in measurements. This interference, however, may be somewhat reduced by using more hydrophilic plasticizers or by eliminating them completely. The sol-gel derived chloride-selective membranes have unique characteristics. In addition to the inherent three dimensional network structure, the matrices do not have plasticizers as their constituents. Naturally, it would be interesting to compare the electrochemical properties of membrane electrodes based on other matrices with no plasticizer. We have compared the potentiometric data obtained with sol-gel method-based membranes to those with polymer matrices, PVC and carboxylated PVC. In addition, the electrodes were utilized as a flow-through detector to observe salicylate interferences in chloride determinations.