

A NEW FLOW-THROUGH ELECTRODE UNIT FOR LIQUID MEMBRANE ELECTRODES

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Ion-selective electrodes have already been employed in continuous flow analytical systems under the basic configurations of the flow-through cells and the sensor end-cups⁽¹⁻³⁾. In the majority of these applications the sample solution is flowing across of the sensing membrane surface. This design usually causes a series of problems such as: air bubble trapping, clogging from particulate matter, instability of the measured potential and development of streaming potential due to the improper geometry of the flow-through cell, etc⁽³⁾. Most of these drawbacks can be eliminated by using a design where the sample solution is channeled through the sensing membrane⁽⁴⁾.

The construction of a new flow-through electrode unit for the preparation of liquid membrane electrodes is described. The construction is based on the use of a triangular piece of glass frit of fine porosity embedded in a plastic circular block. The glass frit serves as inert matrix which holds the electroactive liquid phase. A hole drilled through the glass frit forms the sensing path for the sample stream channeling. The unit is equipped with an internal reference electrode and a reservoir for the ion-exchanger storage. Several flow-through liquid membrane electrodes for calcium, nitrate, perchlorate and picrate ions were prepared using conventional liquid ion exchangers. An automatic continuous flow system consisting of a sampler and a proportioning pump was used for electrode evaluation in combination with a pH/mV meter-recording system.

The prepared electrodes were tested for their stability, reproducibility, response time and working range under various continuous flow conditions. The obtained results show that the proposed new flow-through unit has excellent mechanical and operational characteristics without the disadvantages of the conventional flow-through cells and sensor end-cups.

References

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