Novel Potentiometric Readout to Compensate Drifting Electrochemical Probes

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Signal drift of electrochemical sensors degrades both their precision and accuracy. In this article, we propose a new readout approach, named pulsemetry, for potentiometric measurements to suppress the interference caused by electrochemical potential drift. This approach is a modification of the conventional potentiometric method and incorporates circuit board in series with the potentiometric cell and the high impedance voltmeter. The circuit converts a potential step signal originating from a sample change into a pulse signal. Interference from a constant drift can be effectively eliminated after a simple baseline subtraction. A symmetric potentiometric cell with unconditioned ion-selective electrodes (ISEs) was used as an example of a drifting electrochemical signal source. The results demonstrate improvements in both precision and accuracy compared to the conventional potentiometric readout. This study provides a potential pathway to optimize the performance of electrochemical sensors, making it possible to overcome signal drift in applications such as biological and clinical assays.