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International Conference on Chemical Sensors

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Registration of Small Changes of Calcium Ion Concentration by the Constant Potential Coulometric Method

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Clinical analysis requires to control the ionized calcium in blood. The range of Ca^{2+} in human blood is 1.16 – 1.32 mM, therefore the sensitivity of potentiometric measurements with ion-selective electrodes (ISEs) is insufficient. A promising alternative is the constant potential coulometry [1]. The data on the determination of 0.1% changes of the Ca ion concentration in blood model solutions and in blood serum by this method will be presented. Since the changes are much smaller than the initial value, the charge is linearly dependent on the analyte concentration (not only logarithm, see Figure 1), which is convenient for analytical applications [2]. Features will be discussed of measurements with an electronic capacitor in series with the electrode like propose elsewhere [3], and of the analysis using the charge curve fitting [4]. It will be shown how inaccuracy of the potential setting affects the shape of the coulometric signal.

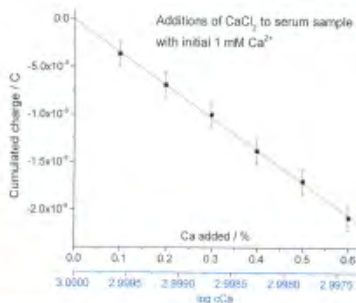


Figure 1. Calibration plot with charge values after additions of CaCl_2 to serum sample.

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