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Interrupted amperometry: A new ultrasensitive electroanalytical method

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Interrupted amperometry is a new technique for diffusion current measuring. The extremely high sensitivity is achieved due to the special approach to the signal-to-noise ratio enhancement. Conventionally, the signal is associated with the diffusion controlled faradaic current. Capacitive current is usually referred to the noise. In interrupted amperometry, capacitive current is included in analytically useful part of the signal as well as faradaic current. Technically this is realized by adding a switcher to the conventional electrical circuit for amperometric measurements. The switcher locks the circuit for the period of time tl and then opens the circuit for the period of time to. Opening (or interrupting) and locking of the circuit are repeated periodically during the entire experiment. The average measured current is defined as: $I_m = T/t_l (I_d + \Sigma I_i)$ where, $T=t_l+to$ is the period of switching, I_d is the diffusion current and Ii are interfering currents. If the T/t_l ratio is of several orders, for example when tl=100 μs and T=100 ms, the measured current also exceeds the diffusion current for several orders. Analytical possibilities of the proposed technique were investigated via direct determination of iron (III), Cd (II), Pb (II) ions, phenol and hydroquinone in aqueous solutions; determination of dichromate ion in titration mode; and determination of oxygen using a Clark-type sensor.

Biography

Daria Navolotskaya completed PhD from Saint-Petersburg State University in 2013. She is currently working as a Senior Lecturer in the department of Analytical Chemistry at the same institution.Professor Sergey Ermakov is the head of the department of analytical chemistry at Saint-Petersburg State University. He has published more than 40 papers in reputed journals.

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