RESOLUTION OF OVERLAPPED PEAKS IN STRIPPING VOLTAMETRY WITH STEPWISE MATHEMATICAL RESOLUTION METHOD

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Overlapping of analytical signals is a common problem in many methods of analytical chemistry, and voltammetry in particular.

The curve fitting method is the one commonly used in resolution of overlapped peaks. But it also has a major drawback in case of high number of overlapped peaks, or in case of its complex shape. The curve fitting in the given conditions includes optimization of great number of parameters. Therefore it requires way too much of calculation and leads increase of uncertainty of results.

A new stepwise mathematical resolution method (SMRM) can be used to overcome the limitations mentioned above.

The basic idea of the SMRM approach is a one-by-one mathematical removal of a signal of a particular analyzed component from a complex (mixed) signal. The key to successful implementation of this method is the choice of an optimization criterion. Such a special criterion estimates the distortion of signal remainder in a part of the overlapping area. To obtain correct results by SMRM it is necessary for resolving signal to coincide with shape, height, position of signal removed from complex curve.

Effectiveness of stepwise mathematical resolution method was verified by resolution of simulated overlapping signals and signals of model chemical systems, obtained in stripping voltammetry.

The application of SMRM was shown by resolution of four-component voltammetric curves of Pt-Bi binary precipitates in stripping voltammetry. Besides proposed approach has been applied to X-ray diffraction overlapping signals.