

Calibration Transfer For Electronic Tongue

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There is a distinct trend in modern analytical chemistry towards development and application of fast, simple and inexpensive analytical methods. Despite the lack of sensitivity and selectivity in certain cases these methods are still able to produce reliable analytical results which are adoptable for industrial practice. One of the promising instruments for application in industry is potentiometric multisensor system– “electronic tongue”. Such system consists of an array of specially designed non-specific chemical sensors. Sensor response is determined by the qualitative and quantitative composition of a sample and is recorded by an appropriate data acquisition system. Being non-selective in nature the response of this array however contains information on multiple species in samples and this information can be effectively extracted by multivariate data analysis techniques. Such measurement protocol allows for solving the problems of sample classification and numerical prediction of particular parameters.

As any other analytical method multisensor system requires calibration before measuring samples with unknown reference characteristics. Calibration is a two-stage procedure: 1) measurement of sample set with known reference parameters; 2) building a mathematic model. Once being established this model allows for prediction of the parameters of interest in new unknown samples. The problems with further application of such models are associated with necessity of periodical sensor changing in the array, sensor drift and untypical samples presented for prediction. All these issues require recalibration of the multisensor system which is a long and tedious process. This circumstance slows down the integration of these systems in industrial cycles. An obvious way to circumvent this limitation is to establish the mathematical methods for calibration transfer from one sensor array to another. While in the field of spectroscopic methods this task is already solved and several protocols such as e.g. PDS are suggested [1], in the field of multisensor systems this important issue was not intensively addressed.

This research is devoted to an attempt of transfer PLS regression model between two physically different sensor arrays having the same set of sensors. Details on samples, transfer protocols and results will be provided in the presentation.

[1] Y.D. Wang, D.J. Veltkamp, B.R. Kowalski, Anal. Chem. 63 (1991) 2750-2756.