Variables Influencing Separation Efficiency in Pressurized Planar Electrochromatography

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Pressurized Planar Electrochromatography (PPEC) is a mode introduced by Nurok et al. [1]. In the mode proposed by these authors the mobile phase is driven into movement by electroosmotic effect and the adsorbent layer is covered and pressed with special foil using hydraulic press. Therefore, vapour phase is no more present in the separating system. There are very few publications on this topic.

In our laboratory, we have designed the device for PPEC, too [2]. Our device enables to perform a measurement of the mobile phase flow rate in the separating system. The flow rate is a very important parameter which influences the separation quality and time of electro-chromatography processes.

Many different variables impact separation efficiency in PPEC, e.g. electric field strength, potential zeta of the stationary phase - mobile phase interface, viscosity of the mobile phase, types of the stationary and mobile phases, mode of sample application, temperature activation of the adsorbent layer and others.

In this presentation, we intend to demonstrate some of these variables which influence the separation efficiency of PPEC system such as sample application mode, flow rate value, electric field strength, type of the stationary and mobile phases basing on the data obtained in our laboratory and presented in contemporary literature by others.

The most important advantage of PPEC is the speed of separation process, which is much greater than in TLC. In addition, the performance of PPEC system is much higher than that of conventional TLC and HPTLC systems – it is comparable to HPLC. However, the performance is strongly dependent on the size of starting – sample spot on the chromatographic plate. Our last proposal of sample application on the chromatographic plate leads to higher performance of PPEC system.

The conclusion which can be drawn from the presented data is as follows: PPEC is a very promising mode for application in laboratory practice.

References

[1] Nurok, D.; Koers, J. M.; Novotny, A. L.; Carmichael, M. A.; Kosiba, J. J.; Santini, R. E.; Hawkins, G. L.; Replogle, R. W. Anal. Chem. **2004**, *76*, 1690 – 1695.

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