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Application of passive sampling techniques as a usable tool in the field of environmental quality monitoring

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Analysis of literature data published for the past 20 years leads to the conclusion, that passive sampling technique has been developing very quickly and is commonly used in the field of monitoring pollutants in air, water and soil environment. The popularity of application of passive sampling techniques in analytical and environmental chemistry results from its many advantages e.g.: Simplicity in use, low costs of exploitation, no need for expensive and complicated equipment, no power requirements, the ability to produce accurate results. Over the last decade in Department of Analytical Chemistry, Gdansk University of Technology passive sampling technique has been applied in different areas of environmental analysis and monitoring, such as:

- Screening studies and source identification - determination of occurrence or identification (qualitative or semi quantitative) of pollutants present in both atmospheric and indoor air;
- Determination of pollutant concentration (BTEX concentrations) in the environment (quantitative) - integration of ambient concentrations of pollutants over time scales: short-time scale (hours/days) and long-time scale (weeks/months/years). The shorter time-scales facilitate studies of pollutant dispersal, fluxes and transport processes. Long time-scales would allow the identification of source/sink regions and underlying trends in ambient levels;
- Mapping the ambient distribution of BTEX (mapping concentrations) to yield input data for regional distribution models - visualization of the spatial distribution of pollution levels in the form of maps allows for sophisticated mathematical analysis and proper decision-making concerning the environment;
- Human exposure assessment - personal monitoring with passive sampling - the most accurate estimate of a personal 'true' exposure;
- Screening (non-invasive) *in-situ* studies on the emission flux of organic compounds (mainly VOCs) emitted from indoor materials, using miniaturized passive emission chambers. This kind of devices combines the features of classical emission chambers in a miniaturized form (miniaturized passive emission chambers), with the advantages of a passive sampling technique (low cost of particular construction elements, possibility of handling by unqualified staff).

Biography

Jacek Namiesnik is the Dean of Chemical Faculty and the Professor of Analytical Chemistry at the Gdansk University of Technology, Poland. He is the Chairman of the committee of analytical chemistry of the Polish Academy of Sciences (PAS) and also the Member of the State Commission for evaluation of scientific degrees and titles. His research interests include new techniques of extraction of analytes from different types of samples and new procedures for determination of a wide range of analytes from samples characterized by the complex composition of the matrix.

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