TODAY PROGRESS OF SENSOR DEVELOPMENT

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Analytical sciences are facing considerable challenges due to the ever increasing demand instruments allowing highly selective and sensitive measurements of chemical and natu compounds of environmental, medical, agricultural, and military, etc. interests.
Today new equipements must preferably offer high throughput capabilities for rapid ass e.g. in drug discovery and screening, antibody production and screening, DNA ba diagnostics, pollution control, food quality control etc. Also instruments for decentraliz testing, requiring minimum maintainance and operating skills, are highly demand Classical analytical methods based on separations such as chromatography and capill electrophoresis generally offer satisfaction in numerous applications. The detection syste associated with those methods have been substantially improved in terms of sensitiv selectivity, reliability and robustness. Currently, mass spectrometric detectors coupled or to separation methods, can be considered as a universal sensing system for many applicat fields. Yet such instrumentation needs considerable skill, high power consumption a maintainance facilities in addition to the high cost of the entire set up. Also such « heav equipements often do not satisfy the high throughput capabilities required as mentio above.
Downsizing chemistry in chip formats is a promising approach in modern instrumentat development. Benefits are : high throughput capabilities, automation, reduced waste srea increased precision and accuracy and disposability. Yet the requirement for sensitivity i major challenge for microchip designer. Mass spectromety is of course universal and hig sensitive and selective but laser fluorescence and electrochemical detection modes of when applicable, equally high sensitivity. Electrochemistry is particularly advantageous microsensors since the electrodes may be readily shaped in miniaturized configurations a arranged in microarray formats.
In the general trend to improve the selectivity and sensitivity of sensors the modificatio conventional or microsized electrodes is currently under intensive investigation.Gold a carbon based electrodes are especially attractive materials for sensor development. Gold e be readily modified by thiol molecules for subsequent biocomponents attachment (enzy antibody, antigen, etc.)
With respect to selectivity, the modification of gold electrodes by a self assembled layer e of thiocholesterol offers substantial selectivity improvement in amperometric discriminat of signals between analyte and interferent [1,2]. Other application may require electr modification by electropolymerization for selectivity improvement [3].
With respect to signal amplification, carbon based composite electrochemical detectors (E with immobilized enzyme horseradish peroxidase (HRP) offer extremely high sensitivity hydrogen peroxide. Amperometric monitoring of HRP in the presence of a suitable re mediator allows subnanomolar determination of hydrogen peroxide [4]. Such

bioelectrocatalytic system may be advantageously exploited in enzyme (oxidase) based I
in electrochemical immunoassays and in DNA biosensing.
Major demands for (bio)sensors are in applications where conventional instrumentation a
microchips do not allow proper determination because of analyte instability, or because
the need for remote or micro-positioning. Determination of analytes such as hydrog
peroxide, nitric oxide, oxygen and reactive oxygen species (ROS), cyanide, sulf
neurotransmittors etc. are challenging in applications where short time resolution, h
selectivity and sensitivity are mandatory.
This presentation will illustrate some current trends in (bio)sensor development w
particular emphasis on recent authors results in this domain.

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