Automation of screen-printed electrodes modification with molecularly imprinted polymer

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The design and application of semi-automatic electrochemical analyzer are reported. The analyzer is based on 3-axis positioning system, which moves unique head designed to mount and dismount electrochemical sensors (screen-printed electrodes). The head mounts electrode in tray and move it to desired wells of multi-well plate filled with modifying and/or analyzed solutions, where electrochemical methods are performed.
There are several field of analytical chemistry, where automation is desired. The reported benchtop device enables to perform electrochemical procedures without significant attention of operator in a high throughput mode and decreases the influence of human errors on the results. Using the reported analyzer, we optimized design of electrochemical sensor for detection of histamine. At first, screen printed electrodes were modified with gold particles using cyclic voltammetry to increase electrode sensitivity towards $[Fe(CN)_6]^{3-}/[Fe(CN)_6]^{4-}$ reporter. The nonconductive layer of molecularly imprinted polymer on electrodes were created by electroplymerizing of a mixture of histamine (analyte) and 3-aminophenol (monomer). The developed sensors were characterized by electroanalytical methods (cyclic voltammetry and electrochemical impedance spectrocopy) and scanning electron microscope.

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