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Nano- and microsized zeolites as a perspective material for potentiometric biosensors creation

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It is well known that enzyme immobilization plays a key role in the development of biosensors. In recent years, the study and optimization of the methods of immobilization have attracted considerable interest of researchers. Special additives injected in the sensitive membrane upon immobilization can improve the sensitivity and stability of the immobilized enzyme. Recently a great deal of attention has been paid to the immobilization of proteins on nanoparticles, in particular zeolites, which are able to retain the biological activity of proteins.

Zeolites are of great interest due to their high surface areas, rigid and well defined pore structures, thermal stabilities, and tailorable surface charges with respect to other types of nanomaterials. Zeolites are known to be stable under both wet and dry conditions and well-tolerated by microorganisms, which provides an enhanced compatibility with biochemical analyses. All these properties make zeolites unique nanomaterials and promising candidates for the immobilization of biological molecules and for advanced analytical tasks.

In this work, some variants of potentometric biosensors containing zeolite crystals are presented. Zeolites were embedded into bioselective elements to improve analytical characteristics of biosensors, i.e. their sensitivity to the substrate, linear and dynamic ranges, signal inter- and intra- reproducibility.

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