Development of miniaturized pH biosensors based on electrosynthesized polymer films

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A new type of pH biosensor was developed for biological applications. This biosensor was fabricated using silicon microsystem technology and consists in two platinum microelectrodes. The first microelectrode was coated by an electrosynthesized polymer and acted as the pH sensitive electrode when the second one was coated by a silver layer and was used as the reference electrode. Then, this potentiometric pH miniaturized biosensor based on electrosynthesized polypyrrole or electrosynthesized linear polyethylenimine films was tested. The potentiometric responses appeared reversible and linear to pH changes in the range from pH 4 to 9. More, the responses were fast (less than 1 min for all sensors), they were stable in time since PPy/PEI films were stable during more than 30 days, and no interference was observed. The influence of the polymer thickness was also studied.

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Résumé en anglais A new type of pH biosensor was developed for biological applications. This biosensor was fabricated using silicon microsystem technology and consists in two platinum microelectrodes. The first microelectrode was coated by an electrosynthesized polymer and acted as the pH sensitive electrode when the second one was coated by a silver layer and was used as the reference electrode. Then, this potentiometric pH miniaturized biosensor based on electrosynthesized polypyrrole or electrosynthesized linear polyethylenimine films was tested. The potentiometric responses appeared reversible and linear to pH changes in the range from pH 4 to 9. More, the responses were fast (less than 1 min for all sensors), they were stable in time since PPy/PEI films were stable during more than 30 days, and no interference was observed. The influence of the polymer thickness was also studied.

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