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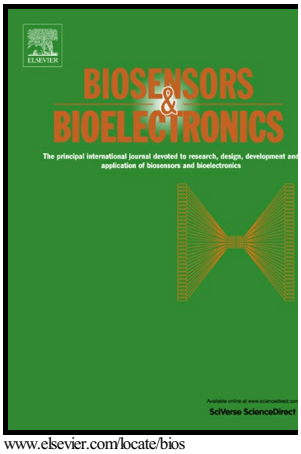

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Fluorescence enhancement and multiple protein detection in ZnO nanostructure microfluidic devices

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Abstract

In this study, different morphological ZnO nanostructures, those of sharp nanowires (NWs), rod NWs, and hexahedral-puncheon nanostructures, were grown in microfluidic channels on the same glass substrate. Characterizations of correspondent biomolecule binding properties were simulated and demonstrated. The surface was modified using 3-ammineopropyl-triethoxysilane (3-APTES) and biotin-N-hydroxysuccinimide ester (NHS-biotin). Different concentrations (4.17 pM to 41.7 nM) of dye-conjugated streptavidin were simultaneously infused through the second microfluidic channels, which lie 90 degrees from the first microfluidic channels. The florescent intensity at the crossover areas showed good agreement with simulations, with sharp ZnO NWs