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Formation of Gold-Silver Hollow Nanostructure via Silver Halide Photographic Processes and Application to Direct Electron Transfer Biosensor Using Fructose Dehydrogenase

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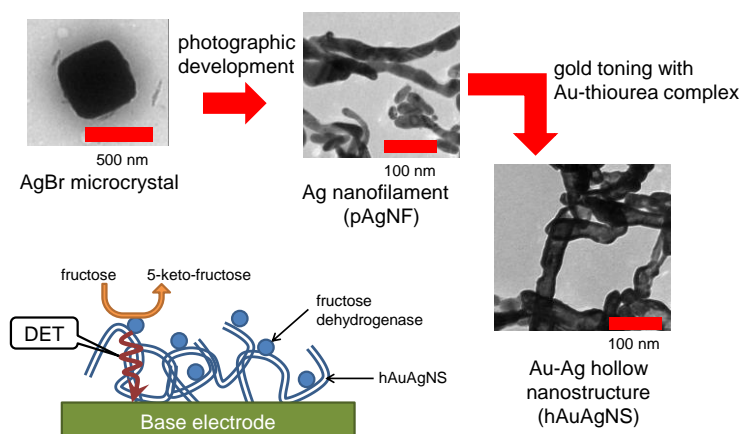
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Abstract

We first employed conventional silver halide photography techniques for constructing a novel nanostructure for electrochemical application. The photographically generated silver nanofilaments from silver bromide microcrystals through chemical development were treated with a gold complex solution. A novel nanostructure composed of silver and gold with hollow structure was obtained, and immobilized on an electrode. The performance as electrocatalyst for direct electron transfer of fructose oxidase was examined and found to be good for biosensor and biofuel cell applications. The current response was kinetically analyzed with a simple kinetic model. Use of carbon paper for the substrate electrode improved the loading amount of the nanostructure and the electrochemical output.

Keywords

silver halide photography; nanostructure; fructose dehydrogenase; direct electron transfer; biosensor



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