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A Novel Electrochemical Ascorbic Acid Sensor Based on Branch-Trunk Ag Hierarchical Nanostructures Electrode

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Abstract

A novel branch-trunk Ag hierarchical nanostructure was synthesized by hydrothermal synthesis combined with microwave-assisted synthesis with Te nanowire as template. The Te nanowire was synthesized via hydrothermal process. The branch-truck Ag hierarchical nanostructures were constructed on Te nanowires through via galvanic replacement reaction with Te nanowire as the sacrifice temple with microwave-assisted synthesis method. We further investigated the potential application of the obtained hierarchical nanostructures for ascorbic acid electrochemical sensor analysis. The results showed the as-prepared sensor exhibited a wide liner range with 0.17μM to 1.80mM (R=0.999) and the detection limit was estimated to be 0.06μM (S/N=3). These results indicated the branch-truck Ag hierarchical nanostructures were an excellent candidate material for sensing application.

Keywords: branch-truck Ag, hierarchical nanostructure; ascorbic acid; electrochemical sensor

Recently, three dimensional (3D) hierarchical nanostructure had provoked considerable interest due to their rich architectures, distinct properties and various novel applications [1-4]. Controlled synthesis of hierarchical