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Hierarchically driven nanostructure electrocatalysts for direct sensing of biomolecules YUMIN LEE, JUN HO SHIM, MINKYUNG KANG, HYE SU JANG, Department of Chemistry & Nano Science, Ewha Womans University, JEONG MIN BAIK, School of Mechanical and Advanced Materials Engineering, Ulsan National Institute of Science and Technology, YOUNGMI LEE, CHONGMOK LEE, MYUNG HWA KIM, Department of Chemistry & Nano Science, Ewha Womans University — Applying nanoscale device fabrications toward biomolecules, ultra sensitive, selective, robust, and reliable chemical or biological microsensors have been one of the most fascinating research directions in our life science. It is still challenging to make miniaturized sensors having the sensitive delectability to biologically relevant species due to limitations in terms of catalytic efficiency and sustainability. We introduce hierarchically driven iridium dioxide nanowires (IrO_2 NWs) directly on a platinum (Pt) microwire, which allows a simple fabrication of the amperometric sensor and shows a favorable electronic property desired for sensing of H_2O_2 and NADH without aid of enzymes. We have prepared highly crystalline IrO_2 needlelike-NWs by an atmospheric pressure chemical vapor deposition of IrO_2 powder without catalyst on a Pt wire surface, IrO_2 NWs-Pt, which was tested as an amperometric microsensor. The structures and morphologies of the IrO_2 NWs were characterized using FE-SEM, HRTEM and Raman spectroscopy. This rational engineering of a nanoscale architecture based on the direct formation of the 1-D nanostructures on an electrode can offer a useful platform for high performance electrochemical biosensors efficiently, sensitive detection of biologically important molecules.

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