

UV nanophotodetector based on a single ZnO: Au nanowire functionalized with Au-nanoparticles

**V. Postica, Th. Pauporté, B. Viana, Cavers, M. Hoppe,
R. Adelung, O. Lupan**

<https://doi.org/10.1117/12.2548136>

Abstract

In this work, an individual nanowire of zinc oxide (ZnO-NW), decorated with gold nanoparticles (Au-NPs/ZnO-NW), was integrated in a nanophotodetector using a dual beam focused electron/ion beam (FIB/SEM) system. Au-NPs/ZnO-NW arrays were synthesized by one-step electrochemical deposition at relative low-temperatures (90 °C). The nanodevice fabricated with a single nanowire Au-NPs/ZnO-NW demonstrated fast detection of UV radiation up to the operating temperature of 120 °C. The improved UV sensing properties of an individual Au-NPs/ZnO-NW compared to a single, undecorated, ZnO NW was explained based on the formation of Schottky barriers at the Au/ZnO NW interface, which resulted in a much more narrowed conduction channel and a lower dark current. These results prove that high-performance hybrid nanomaterials may possess superior electrical, optical and sensing properties and are of great interest for further fundamental studies.