
Improved gas sensing performance of 1-D nanowire with branch and metal nanoparticle

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Nowadays, considerable research has been focused on the one dimensional (1D) nanowires as sensing materials due to their unique sensing properties. Besides, many decoration methods on nanowires have been conducted for the enhancement of gas sensing performance. In this experiment, we report a novel method to increase the sensitivity and selectivity of metal oxide nanowires to target gas by functionalization of branch nanowires and metal nanoparticles. The morphologies of as-synthesized nanomaterials show the formation of metal oxide branches and metal nanoparticles on the stem and branch nanowires. In the gas sensing test, sensor with branched nanowires and metal nanoparticles showed high response to NO₂ gas. The sensing mechanism is related to resistance modulation by the branch formation and catalytic effect by metal nanoparticles. There are multiple junctions between nanowires, branches, boundaries of the branches, and metal nanoparticles/branches, which enable the improvement of gas sensing properties.