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Title	PdO/PdO_2 mixed oxides nanoparticles-functionalized ZnO nanowires
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Description EN	The invention relates to the technology of the metal oxides, in particular to the electrochemical one-step synthesis of Pd and PdO/PdO_2 mixed oxides nanoparticles-functionalized ZnO nanowires at temperature of 90 ºC. The electrolyte solution consist of 0.2 mM $ZnCl_2$ + 0.1 M KCl + $PdCl_2$ 1.5 μM and applied potential of – 0.51 ÷ – 0.7 V. The oxidation of Pd nanoparticles to PdO/PdO_2 mixed oxides was achieved by two-step thermal annealing (at 150 to 250 ºC with growth

rate of 1 ºC/min, and then maintaining at 250 ºC during 12 h). The developed technology allows to essential reducing in technological steps of high performance nanomaterials synthesis.

Applications

It can be applied in the manufacture of high performance hydrogen gas sensors, ultraviolet photodetector, and nanosensors based on individual structures or single nanowire. Due to presence of Pd and PdO/PdO_2 mixed oxides nanoparticles, the possibility of reliable and highly efficient hydrogen gas detection at room temperature is demonstrated. This excludes the necessity of using the microheaters, which considerably reduce the cost of fabrication and power consumption. The obtained highly sensitive nanomaterial can be further integrated in the portable devices for the safety and protection purposes against the indoor and outdoor hydrogen gas leakage, including the industry of semiconductors.

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