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GOLD DECORATED GALIUM OXIDE NANOWIRES FOR MULTIFUNCTIONAL APPLICATIONS

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A three-step fabrication process to produce hybrid nanostructures consisting of Ga_2O_3 nanowires decorated with gold nanodots on GaAs substrates is reported. The process involves electrochemical etching of GaAs substrates [1,2], followed by electrochemical deposition of gold nanodots [3] on GaAs nanowires possessing good electrical

conductivity. Subsequently, thermal treatment in argon atmosphere with a small amount of oxygen is employed to selectively convert GaAs nanowires into Ga_2O_3 nanowires covered by gold nanodots. Moreover, it was demonstrated that this approach offers a controlled fabrication route, enabling precise tuning of nanowire dimensions, crystallographic orientation of the nanowires, as well as modulation of the nanowire' diameter [4]. Characterization techniques such as SEM, EDX and XRD validated the morphology and structure of the produced Ga_2O_3 nanowires. The fabricated hybrid nanostructures exhibit promising properties for various applications in sensing, photodetection, and catalysis, with potential for further optimization through parameter adjustments and functionalization for reaching tailored properties.

The work was supported by the institutional subprogram 02.04.02 no. 4/FI «Development of technologies and investigation of the properties of layered semiconductor compounds, hybrid nanostructures and laser sources».

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