

Electrochemical and Morphological Characterization of Gold Nanostructures on GaAs

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Abstract: Previous studies have demonstrated that electrochemical nanostructuring of GaAs allows the fabrication of porous structures and nanowires, providing suitable platforms for the deposition of metal nanostructures¹⁻³. In the present work, gold nanostructures were formed on GaAs substrates by electrochemical deposition and their morphology was investigated by atomic force microscopy (AFM), which revealed the formation of nanostructured gold films with increased surface roughness compared to sputtered Au films. The electrochemical properties of bulk GaAs and Au-modified GaAs electrodes were studied by cyclic voltammetry. The ferri/ferrocyanide redox system was used as an electrochemical probe to evaluate the electrochemically active surface area of the electrodes. The results indicate differences in the electrochemical response and an increase of the electrochemically active surface area after gold electrodeposition. The obtained results suggest that gold nanostructures on GaAs substrates may represent promising platforms for electrochemical sensing and nanoelectronic applications.

Keywords: Gold nanostructures, porous GaAs; electrodeposition; topology; cyclic voltammetry; electrochemically active surface area.

References

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