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GROWTH OF ZINC OXIDE NANOSTRUCTURES BY THE VAPOR-LIQUID-SOLID TECHNIQUE: EFFECT OF THERMAL TREATMENT ON THE SEED LAYER AND CATALYST

In this work, zinc oxide nanostructures were grown using the Vapor-Liquid-Solid (VLS) growth technique. To promote the growth of the nanostructures, a seed layer of aluminum-doped zinc oxide (AZO) and gold as a catalyst was used. This study investigates the effect of thermal treatment on the seed layer and the catalyst before to VLS growth, aiming to ensure that the seed layer and the catalyst undergo minimal changes during the initial stages of growth. As a result of the thermal treatment, changes in the morphology of both the seed layer and the catalyst were observed. If these changes occur during the initial stages of growth, they would affect the growth of the nanostructures and prevent them from growing in the same direction as the grains in the seed layer. The growth direction is crucial as it defines the morphology and the crystal planes on the surface. Additionally, displacement and fragmentation of the catalyst were observed, generating branches, except for the nanostructures where the catalyst is located on the polar planes (0002), indicating that the Au/Zn mixture has lower solubility on the polar planes (0002)

Keywords

zinc oxide, nanostructures, crystal planes, seed layer

Reference

Functionalization of 3-aminopropyltrimethoxysilane Self-Assembled Monolayers on ZnO/Au nanowires: Role of the Seed layer. DOI:10.1016/j.matlet.2021.129452

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