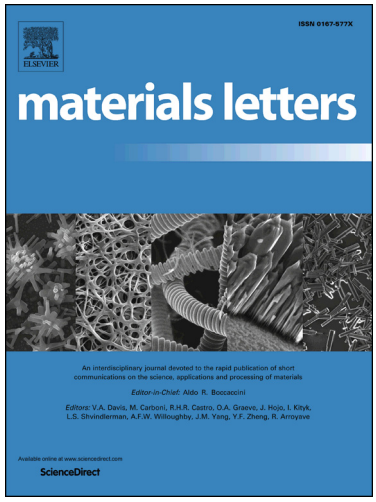

Influence of applied voltage on the characterization of direct current electrodeposited CoZn alloy nanowires

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Influence of applied voltage on the characterization of direct current electrodeposited CoZn alloy nanowires

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Abstract:

The CoZn alloy nanowires have been fabricated by direct current electrodeposition technique with confined nanochannels of porous anodized aluminum oxide as template. The applied voltage was set in the range from -1.2 V to -1.4 V to adjust the Co/Zn ratios in CoZn alloy nanowires. Electron microscope images show that the as-prepared CoZn alloy nanowires are regular and uniform with an average diameter of 50 nm, which coincides with the size of the used template. The influence of applied voltage on the morphology and structure of CoZn alloy nanowires is systematically studied. The surface of the CoZn alloy nanowires changes from smooth to rather rough with increasing applied voltage from -1.2 V to -1.4 V. Besides that, the Co/Zn ratio of the as-prepared CoZn alloy nanowires has a nonlinear increment relation with increasing applied voltage. X-ray diffraction results reveal that the structure of the CoZn alloy nanowires change from the amorphous to hcp crystalline phase with increasing applied voltage from -1.2 V to -1.4 V.

Keywords: Electrodeposition; CoZn alloy nanowires; AAO template; Direct current; Structural.

1. Introduction

The one-dimensional metallic alloy nanowires have attracted intensive attention due to their novel physical properties differing from the corresponding bulk forms [1] and huge potential applications in industrial applications, such as electronic components, sensors [2] and ultra-high density memory devices, etc. [3]. Many attempts have been