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Simple fabrication of copper surfaces with tunable wettability and multi-level structures via one-step method

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Abstract: Copper surfaces, with nanowire, microflower and nanowire/microflower hierarchical structures, were fabricated by a simple and convenient one-step approach without any further treatment. Variation of fine structure, composition, surface roughness and wettability on copper surfaces with etching time and etching solution was systemically investigated. Results revealed that with a little difference in etching time, wettability could change a lot, from high hydrophobicity to superhydrophilicity. What's more, the mechanism of difference in wettability of copper surfaces, etched by different concentrations of etching solution, was clarified. Surface composition and morphology were key factors to exert a critical influence on the wettability of copper surfaces.

Key words: surfaces, copper, wettability, multilayer structure, facile preparation, etching;

1 Introduction

Copper and copper oxide have attracted tremendous interest on account of their excellent physical and chemical properties and are used in a wide range of applications [1-3]. Meanwhile, nanostructured materials possess many unique characteristics because of their quantum size effect, surface effect and volume effect [4]. Hence, combining excellent properties of copper

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