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射频反应磁控溅射制备氮化铜薄膜

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摘要: 使用射频反应磁控溅射法, 在不同的射频功率和气体流量比下制备了氮化铜薄膜, 并用X射线衍射仪和原子力显微镜对薄膜的结构进行表征。研究表明: 薄膜呈现择优生长规律, 由低气体流量比的Cu₃N(111)晶面转向高分压的(100)面; 薄膜的光学带隙在1.44-1.69 eV之间, 电阻率在60-5.6×10⁵ Ω·m之间, 二者都随气体流量比的增大而增大。

关键字: 氮化铜薄膜; 晶体结构; 光学带隙; 电阻率

Copper nitride thin films prepared by radio frequency magnetron sputtering

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Abstract: Copper nitride (Cu₃N) thin films were deposited by reactive radio frequency magnetron sputtering under different discharge powers and gas flow ratios. The structures of films were characterized by atomic force microscopy (AFM) and X-ray diffraction spectra (XRD). The properties of films were analyzed by UV-VIS spectra and four-probe method. The results show that the films' growth prefers (111) direction at low nitrogen press and (100) direction at high nitrogen pressure. The optical band gap of the films ranges from 1.44 to 1.69 eV, the resistivity ranges from 60 to 5.6×10⁵Ω·m, and they both increase with the increase of nitrogen pressure.

Key words: copper nitride thin films; crystal structure; optical band gap; resistivity

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