



发光学应用及交叉前沿

不同氧气含量下镍铬系平板集热器选择性吸收薄膜的制备和性能表征

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摘要：采用双极脉冲磁控溅射系统，在不同氧气含量的氧氮混合气体中制备了单层镍-铬金属-电介质复合光谱选择性吸收薄膜。采用X射线衍射仪（XRD）、激光共焦显微拉曼光谱仪、椭偏仪和紫外-可见-近红外分光光度计分别对薄膜的物相结构和光学特性进行了表征。结果表明：实验获得了由金属镍和镍、铬的氧化物（NiO、Cr₂O₃）组成的复合膜，薄膜对300~1 200 nm波段的太阳光有较强的吸收，而对波长大于1 200 nm的太阳光则吸收较弱，具有良好的光谱选择性，可用作高效太阳光谱选择性吸收涂层。

关键词：选择性吸收 镍铬金属-电介质复合膜 磁控溅射 物相结构 光学性能

Characterization of Ni-Cr System Based Solar Selective Absorbing Films Prepared at Different Oxygen Content

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Abstract: The single layered Ni-Cr metal-dielectric composite spectral selective absorbing films were prepared by bipolar pulsed magnetron sputtering in a gas mixture of oxygen and argon at different oxygen content. The X-ray diffractometer (XRD), Raman spectrometer, ellipsometer, and UV-Visible-NIR spectrometer were used to characterize the phase structure and optical properties of the thin films. The results show that the films composed of Ni, NiO and Cr₂O₃ exhibit good solar spectrum selective absorption, which have higher absorption in the range of 300~1 200 nm and lower absorption for the wavelength over 1 200 nm.

Keywords: selective absorption Ni-Cr metal-dielectric composite films pulsed magnetron sputtering phase structure optical characterization

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