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Influence of the Growth Temperature on the Properties of the Transparent and Conductive NiO Thin Films Obtained by RF Magnetron Sputtering

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Transparent and conductive nickel oxide (NiO) thin films were deposited on the glass supports by magnetron pulverization (RF). The NiO thin films were investigated by X-ray diffraction (XRD), scanning electron microscopy (SEM), SEM equipped with X-ray detector-analyzer (EDX), UV-VIS spectroscopy and Hall measurements. XRD revealed that the NiO thin films obtained at different substrate temperatures are textured and possess a cubic crystalline structure. SEM analysis indicates the formation of the crystallites with a granular structure. The EDX spectra of the NiO thin films highlighted the presence of Ni and O as elementary components. With the increase of the substrate temperature from 50 to 450°C Hall measurements show a decrease of the resistivity of the NiO thin layers due to the increase of the concentration and mobility of the free carriers.