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Thesis Title	*Preparation of thin layers/films of vanadium oxides and their electrical characterization in the range 80≤T≤500K*
Supervisor	E. Syskakis, Assistant Professor
Summary	In the present work, the electrical properties of thin PVD films, as well as of sintered and dense layers of V_2O_5 and VO_2 deposited on Y-ZrO_2 and Si substrates were investigated by electrical resistivity R(T) measurements and current-voltage (I-V) characteristics in the range 80-550 K. The VO_2 layers were obtained by vacuum (10^{-2}mbar) reduction of V_2O_5 layers at T= 480-600 ^oC for t=1-12 hours. The phase constitution and microstructure of the specimen were examined by X-ray Diffraction (XRD) and scanning electron microscopy (SEM), respectively. According to the results the electrical conductivity of the V_2O_5 specimen can be attributed to thermally activated hopping of small polarons between V^{4+} and V^{5+}. Both the conductivity as well as the corresponding activation energy depend strongly on the microstructure of the specimen. In the reduced specimen the XRD identification analysis shows, apart from the VO_2 layer, coexistence of V_6O_{13} and/or V_2O_5. Nevertheless, an abrupt drop has been observed in the R(T) measurements at T_{MIT}=330 K which is attributed to the metal insulator transition (MIT) in the VO_2 layer. The thermally activated MIT takes place within 1-2 K and is accompanied by small (2-4K) hysteresis, while the resistance drops by up to 3 orders of magnitude. Both the R(T) data as well as the I-V characteristics provide conclusive evidence that the MIT can also be triggered by an external dc electric field.
Key words	Vanadium oxides, Electrical conductivity, Small polaron, Metal-insulator transition (MIT), Vacuum reduction
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