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Reduction of Vanadium Oxide (VOx) under High Vacuum Conditions as Investigated by X-Ray Photoelectron Spectroscopy[1] A. CHOURASIA, Texas A&M University-Commerce — Vanadium oxide thin films were formed by depositing thin films of vanadium on quartz substrates and oxidizing them in an atmosphere of oxygen. The deposition was done by the e-beam technique. The oxide films were annealed at different temperatures for different times under high vacuum conditions. The technique of x-ray photoelectron spectroscopy has been employed to study the changes in the oxidation states of vanadium and oxygen in such films. The spectral features in the vanadium 2p, oxygen 1s, and the x-ray excited Auger regions were investigated. The Auger parameter has been utilized to study the changes. The complete oxidation of elemental vanadium to V2O5 was observed to occur at 700°C. At any other temperature, a mixture of oxides consisting of V2O5 and VO2 was observed in the films. Annealing of the films resulted in the gradual loss of oxygen followed by reduction in the oxidation state from +5 to 0. The reduction was observed to depend upon the annealing temperature and the annealing time.

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