

Irreversible metal-insulator transition in thin film VO₂ induced by soft X-ray irradiation

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In this study, we show the ability of soft x-ray irradiation to induce a room temperature metal-insulator transitions (MIT) in VO₂ thin films grown on *R*-plane sapphire. The ability of soft x-rays to induce the MIT in VO₂ thin films is confirmed by photoemission spectroscopy and soft x-ray spectroscopy measurements. When irradiation was discontinued, the systems do not return to the insulating phase. Analysis of valence band photoemission spectra revealed that the density of states (DOS) of the V 3*d* band increased with irradiation time, while the DOS of the O 2*p* band decreased. We use these results to propose a model in which the MIT is driven by oxygen desorption from thin films during irradiation.