

Surface Analysis of RuO₂

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A conductive oxide, RuO₂, has been recently studied as a bottom electrode for ferroelectric thin film capacitors because of its excellent electrical and diffusion barrier properties. Electrical properties vary as the stoichiometry of RuO₂.

RuO₂(x=0~2) thin film were prepared by reactive sputter deposition. The physical properties were investigated by Auger electron spectroscopy (AES), and X-ray photoelectron spectroscopy (XPS).

Core level spectra of XPS did not show any distinctive difference between the prepared samples. The valence band spectra, however, revealed a characteristic relationship. A sharp valence d-band near the Fermi edge, which is closely related to conductivity, has been observed in the RuO₂. A broad valence d-band has been observed in case of oxygen deficient film.

In Auger electron spectra of RuO₂, a main peak for MVV transition was observed at 274 eV. A distinct peak at 269.8 eV has been observed. It can be attributed to the cross transition between Ru and O atoms. This cross transition, however, was not found at the pure Ru metal. The effect of the oxygen deficiency in RuO₂ film will be discussed.