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Revised manuscript

Low-temperature growth of VO₂ films on transparent ZnO/glass and Al-doped ZnO/glass and their optical transition properties

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Keywords: Vanadium dioxide (VO₂), Zinc oxide (ZnO), Low temperature growth, Al-doped ZnO, Optical properties

Abstract

Vanadium dioxide (VO₂) is a promising compound for thermochromic applications because of its insulator-metal transition (IMT) characteristic with concomitant transmittance change for infrared-light. For practical applications, we deposited VO₂ thin films on transparent ZnO films on glass substrate. Growth of (010)-oriented VO₂ film was obtained on c-axis oriented hexagonal ZnO layer, however, zinc vanadate (Zn₂V₂O₇) was formed at the interface region in conventional radio-frequency magnetron sputtering at substrate temperature of 350 °C. On the other hand, (010)-oriented VO₂ films were successfully grown on ZnO/glass substrates even at lower temperature of 250 °C by introducing inductively coupled plasma (ICP)-assisted sputtering, realizing steep interface between VO₂ and ZnO without undesirable compounds. The VO₂ films showed resistivity drop of more than two orders of

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