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Optical investigation of redox properties of amorphous V_2O_5 thin films¹ JONG-GUL YOON, Department of Physics, University of Suwon, Korea, TAE DONG KANG, TAE WON NOH, IBS-Center for Functional Interfaces of Correlated Electron Systems and Department of Physics and Astronomy, Seoul National University, Korea, USW COLLABORATION, RECFI COLLABORATION — We report a high sensitivity of the optical properties of amorphous V_2O_5 thin films to redox reaction. Temperature dependence of spectroscopic ellipsometry data showed that the amorphous V_2O_5 films were optically anisotropic and the optical constants of the films changed irreversibly in high vacuum at around 420-480 K. Formation of oxygen vacancies in V_2O_5 film by the reduction process may result in the anisotropic changes in the optical constants and optical band gaps. Layered structure of V_2O_5 and structural relaxation by the formation of vanadyl oxygen vacancies were attributed to the optical anisotropy and the changes in the optical properties, respectively.

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