

# Detailed Measurement of Ti 2p Resonant X-ray Raman Scattering of Ti<sub>2</sub>O<sub>3</sub> and its Polarization Dependence Measurements.

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Ti<sub>2</sub>O<sub>3</sub> is typical Mott-Hubbard insulator that undergoes metal-insulator transition at about 200 °C. Resonant x-ray emission spectra (XES) of Ti<sub>2</sub>O<sub>3</sub> at R.T. (insulator phase) were observed under excitation at around the Ti 2p absorption edge. The XES measurements were performed at the beam-line BL2C in Photon Factory, KEK. The excitation energy was changed in fine step (~ 0.3 eV) from 453 to 482 eV. About one hundred numbers of XES spectra were plotted in a graph as contour plot. The resonant XES at polarized and depolarized configurations are shown in Fig.1(b) and (c), respectively. Since the fluorescence is incoherent process, the spectrum is observed in both configurations as shown by horizontal dotted lines. On the other hand, since the x-ray Raman scattering (XRS) is coherent process, the spectrum is observed strongly in polarized configuration. The XRS of charge transfer and *d-d* excitations are observed in the polarized spectrum as shown by oblique dotted line. The detailed change of XRS at the resonant condition became clear. In addition, partial photon yield (PPY) spectra, in which the emission intensity around Ti 3d → 2p fluorescence energy is observed with about 50 eV band width, were observed. The polarization dependence of the PPY spectrum is shown in Fig.1(a) with total electron yield (TEY) spectrum.

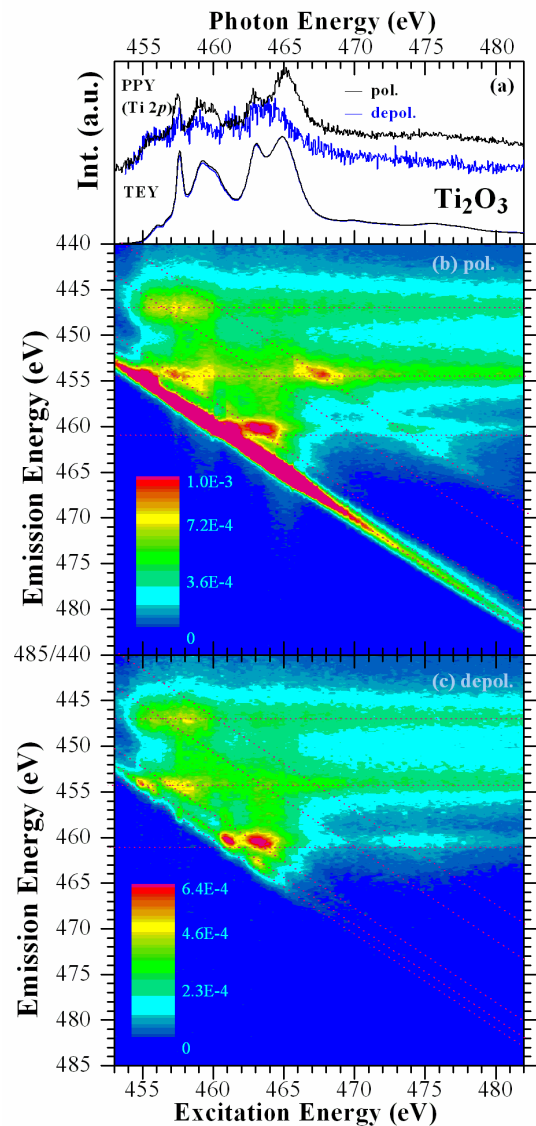


Fig.1 (a) XAS spectra by TEY and PPF methods. (b)(c) Resonant XES spectra in pol. and depol. configurations, respectively.