

# Studies of metal to insulator transition by bulk sensitive photoelectron spectroscopy

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## 【Outline of survey】

The origin of the metal to insulator transition in strongly correlated electron systems is still not fully understood. By use of high resolution photoelectron spectroscopy remarkable progress has been realized in the last decade. However, photoelectron spectroscopy is hindered by the high surface sensitivity in the range below 5Å in the case of conventional measurement. Since the ratio between the electron correlation energy  $U$  and the electron transfer energy  $t$  is much larger in the surface, the electronic state on the surface is much more localize than in the bulk. Therefore a lot of controversies are recognized in many materials. Here we perform very bulk sensitive photoelectron spectroscopy by use of hard X-rays above 7 keV and below 12 eV. The resolutions expected are 30meV at 8 keV and 300  $\mu$ eV below 12 eV.

## 【Expected results】

Since higher inelastic mean free path up to 100Å is expected for photoelectrons above 7keV of kinetic energies and also for some materials below 12eV, rather bulk information on electronic structures will be obtained by the present photoelectron spectroscopy. We can solve the discrepancies of the discussion proposed so far for the metal-insulator transitions in various strongly correlated materials.

## 【References by the principal researcher】

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【Term of project】 FY2006 - 2008

【Budget allocation】 20,000,000 yen

【Homepage address】

<http://decima.mp.es.osaka-u.ac.jp/>