



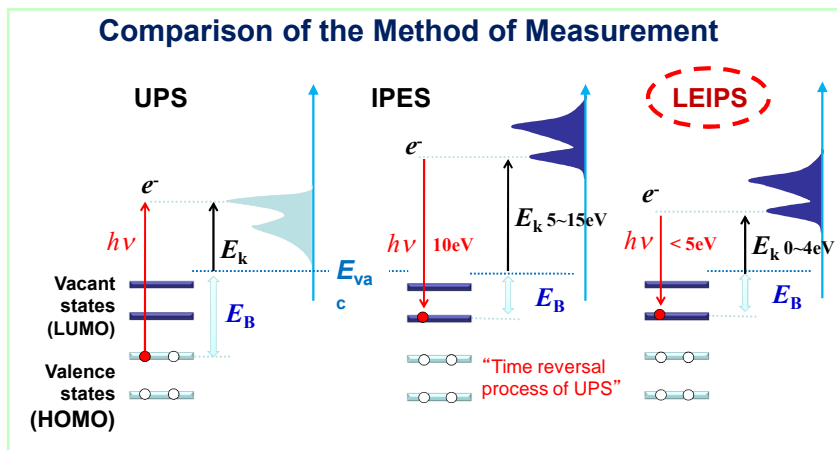
Low-Energy Inverse Photoemission Spectroscopy (LEIPS)

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1. Abstract

- Electron affinity (LUMO Level) is the key parameter for the R&D of the organic electronics.
- Conventional Inverse Photo-emission Spectroscopy (IPES) has problems:
Target materials are easy to be damaged and energy resolution is low.
- Low-Energy Inverse Photoemission Spectroscopy (LEIPS) solves the problems.

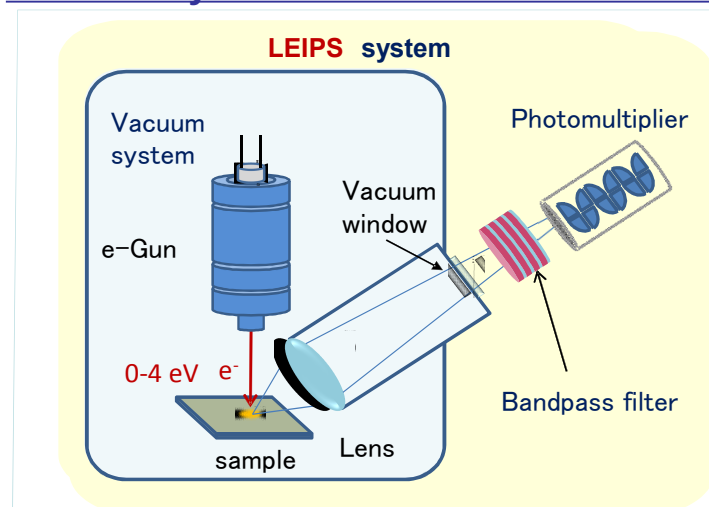
2. Principle of the Invention



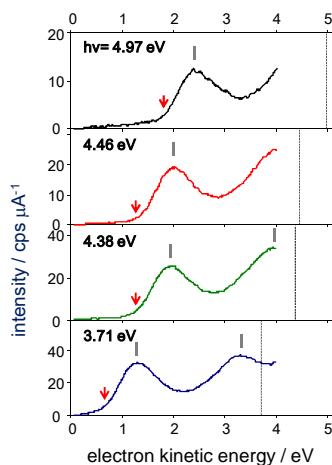
LEIPS features:

- Use of low-energy electron reduces damage to the target material.
→ **Damage: negligible**
- Emitted photon energy ($h\nu$) shifts from VUV to NUV region.
VUV : Vacuum UltraViolet NUV : Near UltraViolet
→ **Easy adaption of the standard spectroscopy technology**
- Detection precision/resolution is improved.
→ **Resolution improved a factor of 2 (< 0.3 eV)**

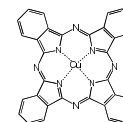
3. LEIPS system and Measurement Data



Precise Determination of the Electron Affinity



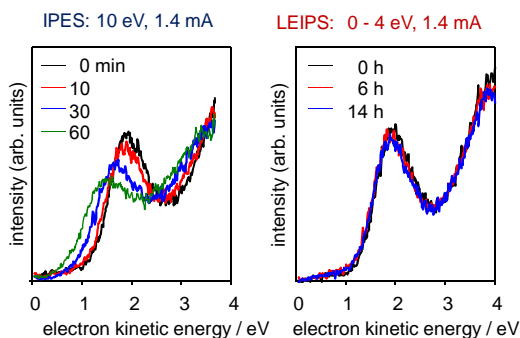
CuPc: Copper Phtharocyanine



Electron Affinity: 3.09 ± 0.05 eV

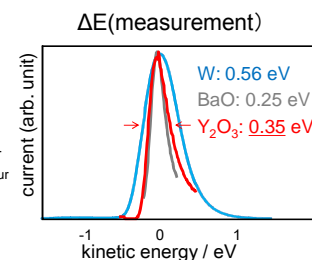
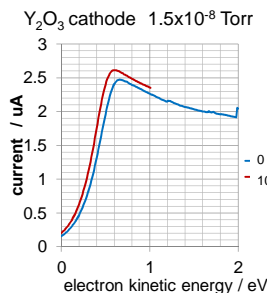
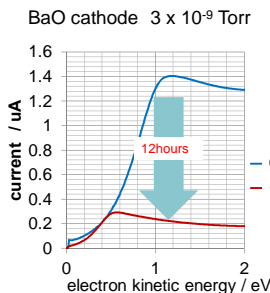
Precise measurement of the Electron Affinity is enabled by changing the energy level of the detection photon.
($h\nu = E_B + E_K$)

Damages to an organic material



LEIPS available at low vacuum: Y_2O_3 Source & New Optical System

Emission current variation with Time



4. Application

For R&D of organic electronics such as organic light emitting diode and organic photovoltaic cells

Patent Licensing Available

Patent : WO2013/129390 (JP, US, EP) , JP2014-111515

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