

Key Word: AES, maps, Chemical state, cBN

# Chemical State Mapping Using High Energy Resolution AES

## 1. Definition of energy resolution in AES and XPS

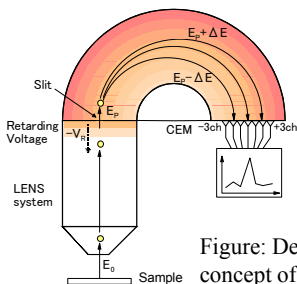


Figure: Design concept of analyzer

Two different modes are available for measuring the electron kinetic energy: CAE (Constant Analyzer Energy) and CRR (Constant Retarding Ratio). XPS uses CAE in which the energy resolution is constant regardless of the measured electron energy, while AES uses CRR in which the energy resolution increases in proportion to the measured electron energy while the penetrating rate remains constant.

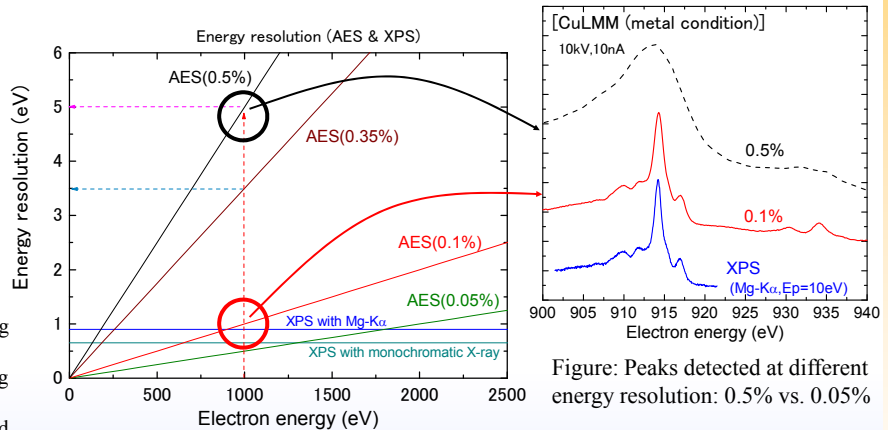


Figure: Peaks detected at different energy resolution: 0.5% vs. 0.05%

The figures above show XPS has higher energy resolution than conventional AES (0.5%) whereas AES, at an energy resolution of 0.05%, has higher energy resolution for electrons at 1200 eV or lower.

## 2. Mapping of N in BN and TiN

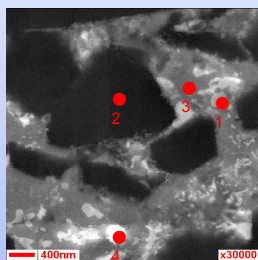


Figure: Cross section of diamond CBN tool prepared by CP(\*)

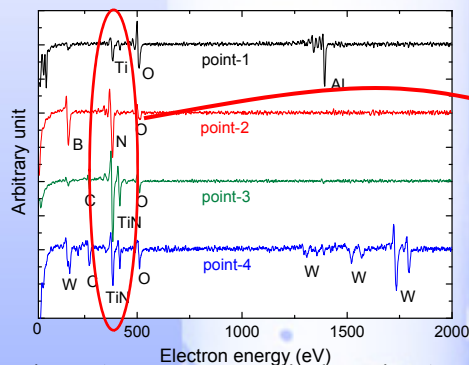
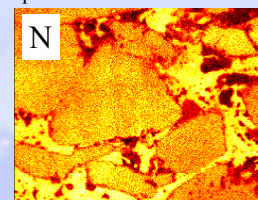
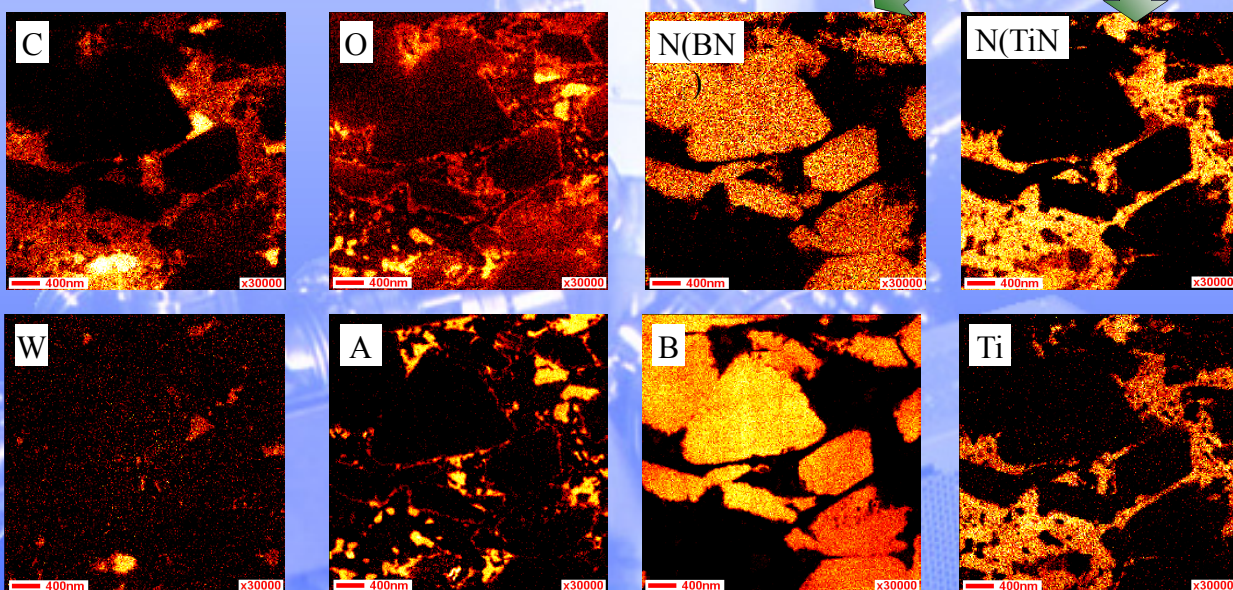


Figure: Auger spectra acquired at points 1 to 4

N was detected almost on the entire surface in mapping at an energy resolution of 0.5% since the sample contained TiN and BN.



High energy resolution mapping can detect different chemical states at different peak positions.



Access the QR codes below for more information on the Field Emission Auger Microprobe

◆ Overview →



◆ Mechanisms →

