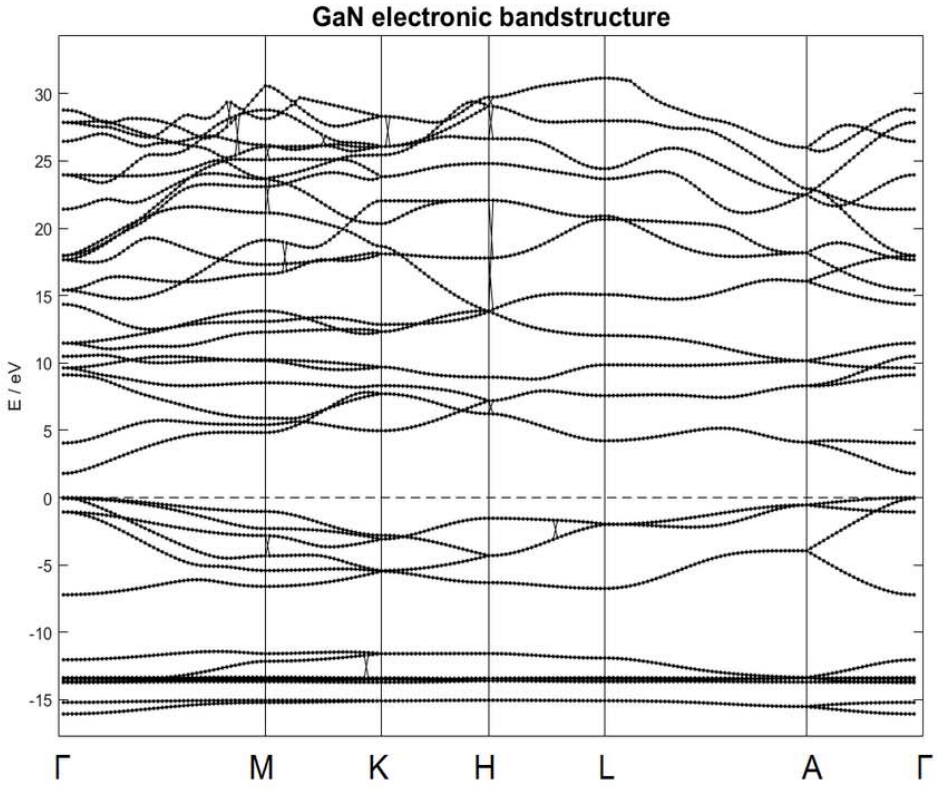
Photoemission

- Band structure calculations: GaN, 6H SiC, GaAs, GaP, Ge, InAs
- Calculated electron density of states
  - Al fcc, Au fcc, Cu fcc, Na bcc, Pt fcc, W bcc, Si diamond, Fe bcc, Ni fcc, Co fcc, Mn bcc, bcc, Gd hcp, Pd fcc, Pd_3Cr, Pd_3Mn, PdCr, PdMn , GaN, 6H SiC, GaAs, GaP, Ge, InAs

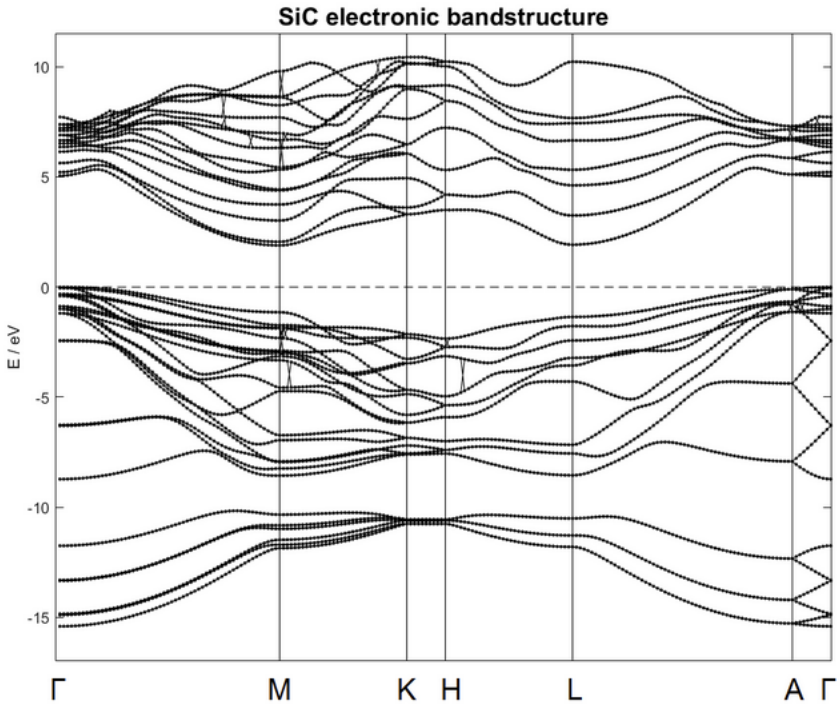
Bandstructure of hexagonal gallium nitride (GaN)

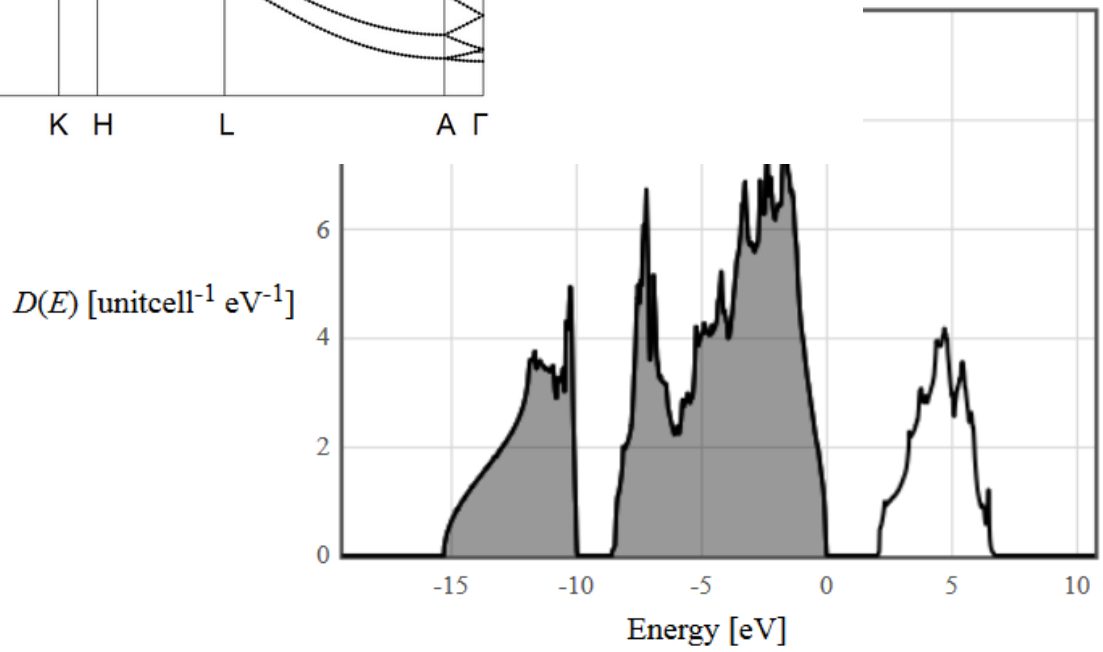
The bandstructure calculation for gallium nitride was calculated using the program Quantum Espresso (version 5.2.1) and the pseudopotentials for Ga and N.



Bandstructure of hexagonal silicon carbide (SiC)

The bandstructure calculation for silicon carbide was calculated using the program Quantum Espresso (version 5.3.0) and the pseudopotentials for Si and C.



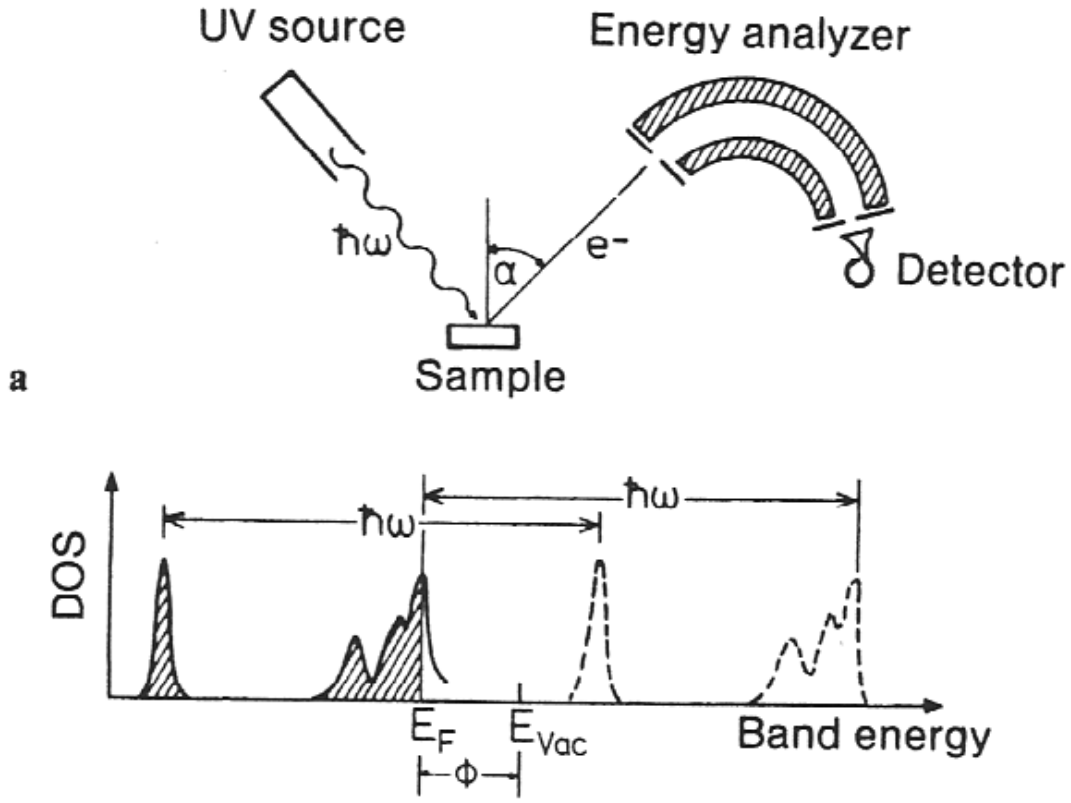


Photoemission spectroscopy

UPS - Ultraviolet photoemission spectroscopy

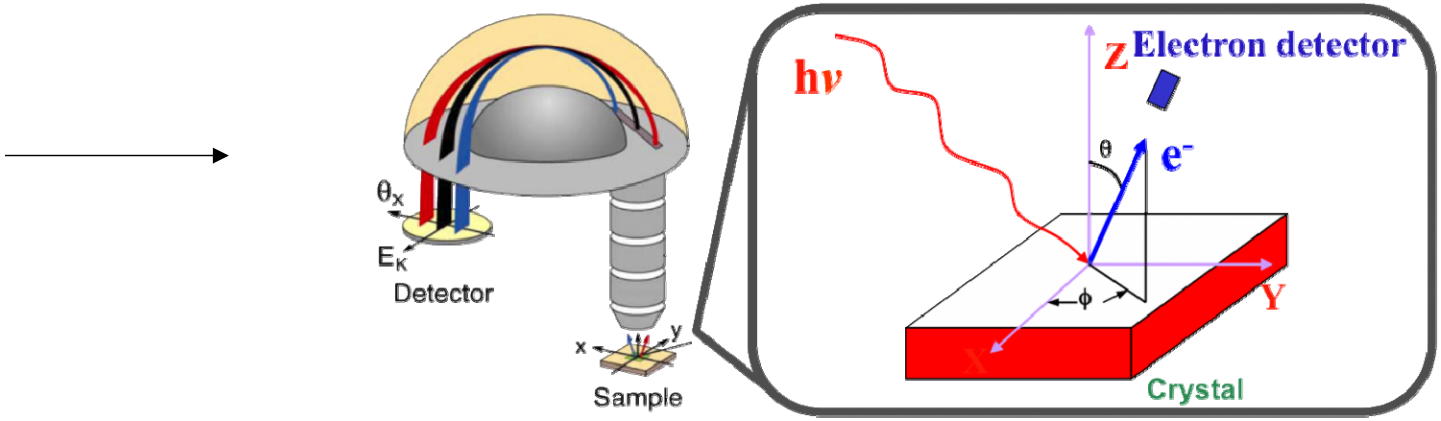
XPS - X-ray photoemission spectroscopy

Measure the density of states with photoemission spectroscopy

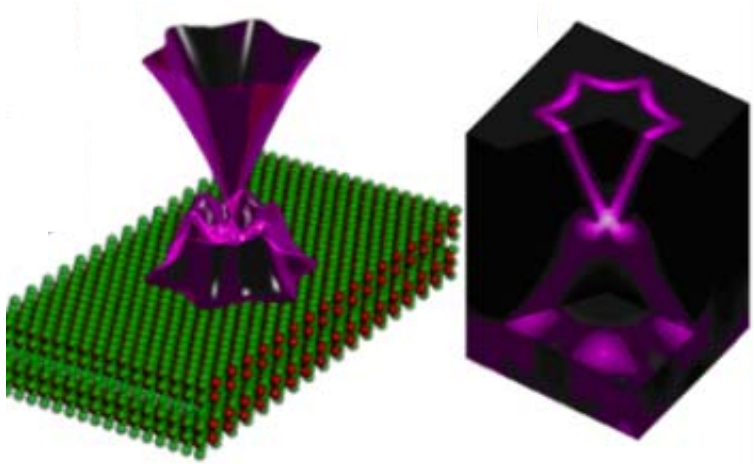


From: Ibach & Lueth

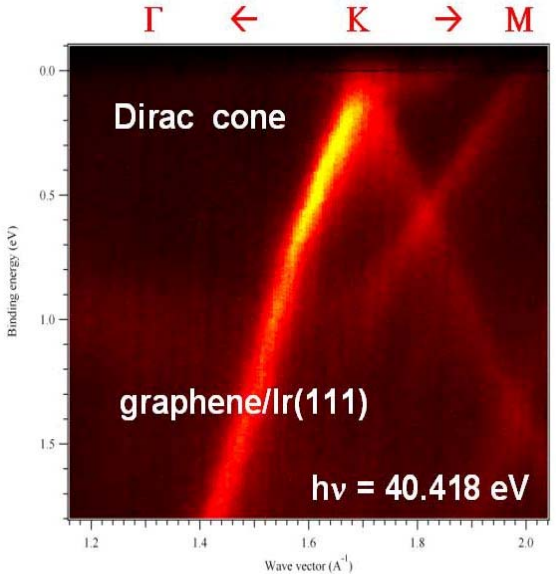
Angle resolved photoemission spectroscopy (ARPES)



Bi_2Te_3



Topological insulator

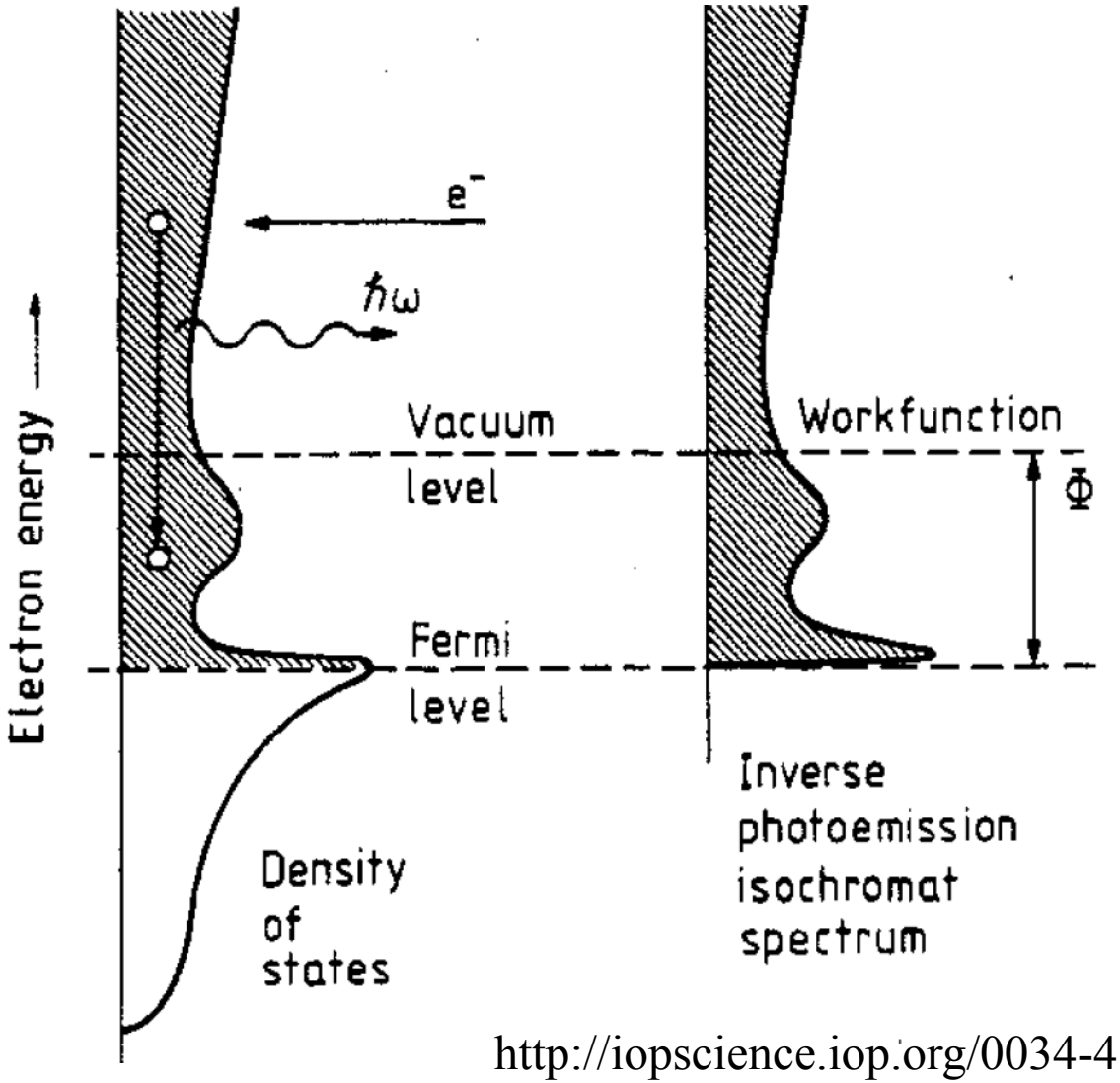


Measure the dispersion relation with angle resolved photoemission

https://arpes.stanford.edu/research/tool-development/angle-resolved-photoemission-spectroscopy

http://server2.phys.uniroma1.it/gr/lotus/Instrumentation1_M.htm

Inverse photoemission spectroscopy (IPES)



http://iopscience.iop.org/0034-4885/51/9/003

k-resolved Inverse Photoemission Spectroscopy (KRIPES)

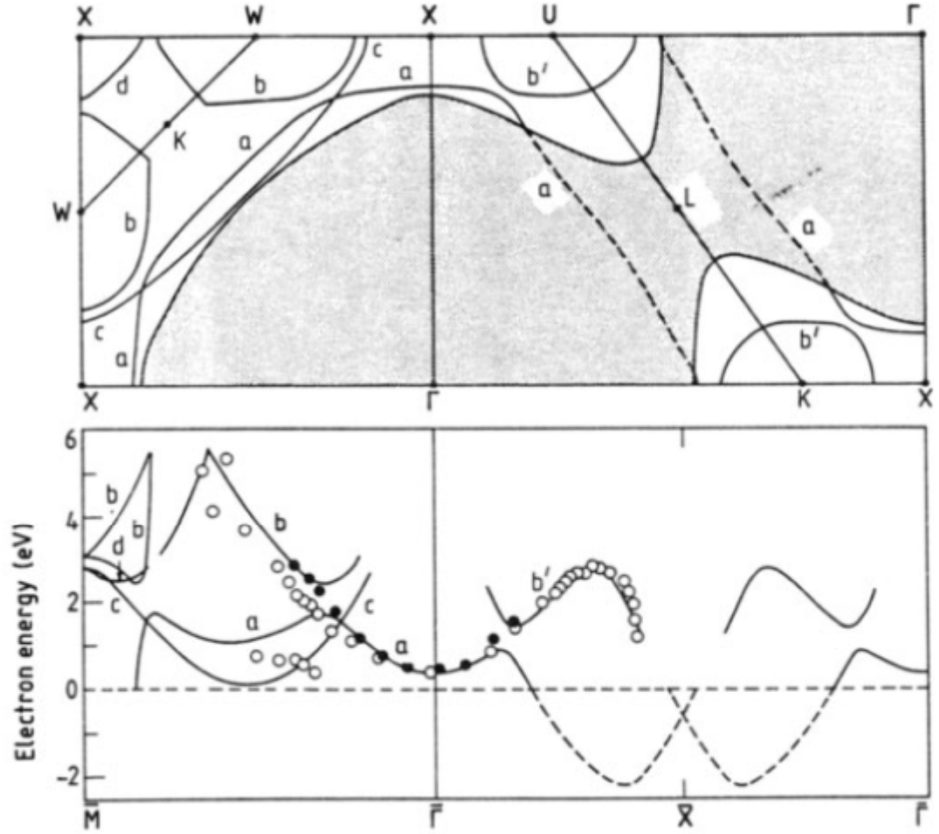
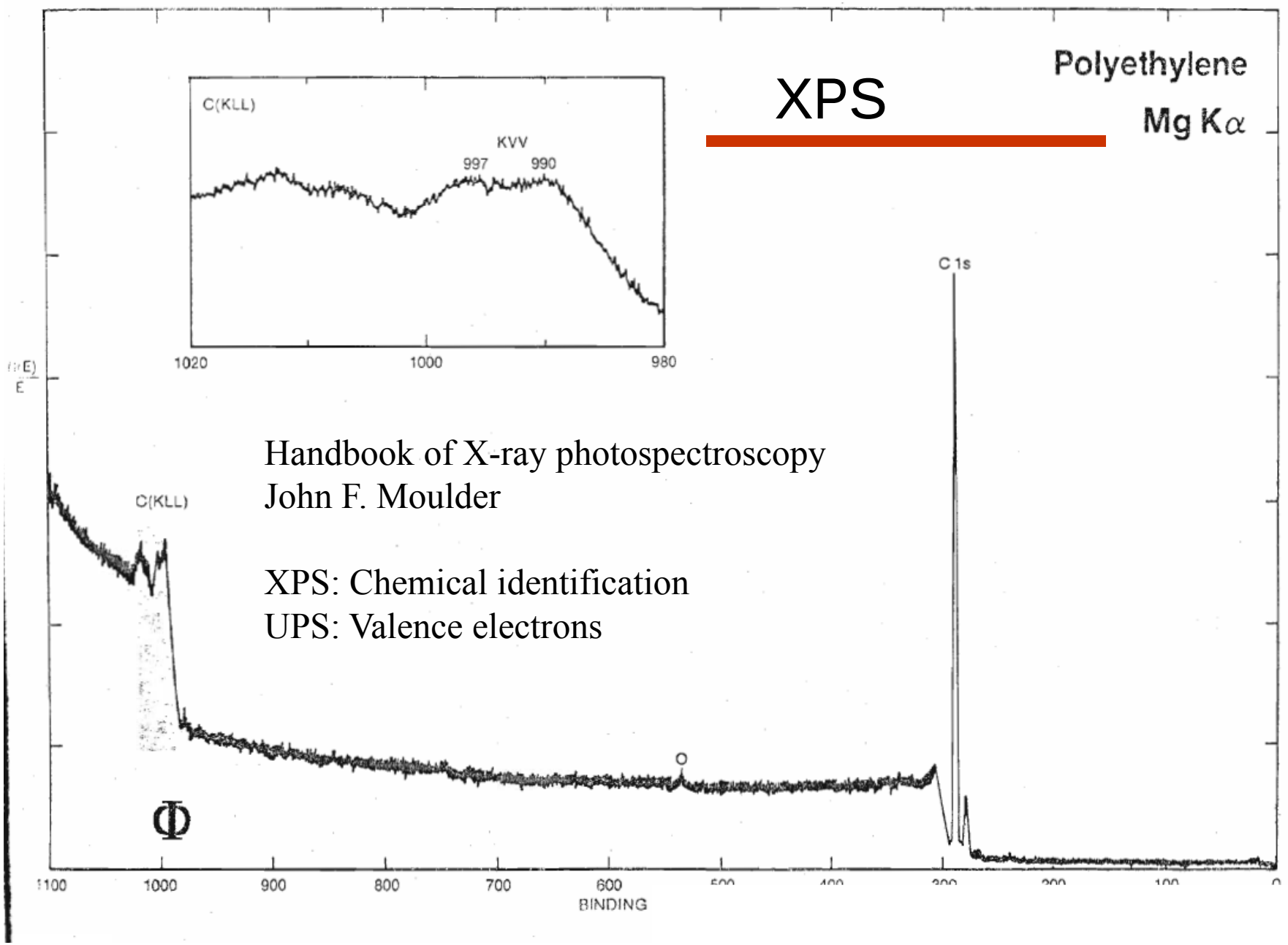


Figure 9. Band calculations and data for bulk direct transitions in the two principal azimuths $\bar{\Gamma}\bar{M}$ and $\bar{\Gamma}\bar{X}$ and Cu(001). Upper panel shows the Fermi surface and isochromat curves at $\hbar\omega = 9.7$ eV for transitions into band 6. Lower panel shows the corresponding $E_f(k_\parallel)$ projections. Computations and filled data circles are from Woodruff *et al* (1982); open circles are data from Jacob *et al* (1986).

http://iopscience.iop.org/0034-4885/51/9/003

XPS



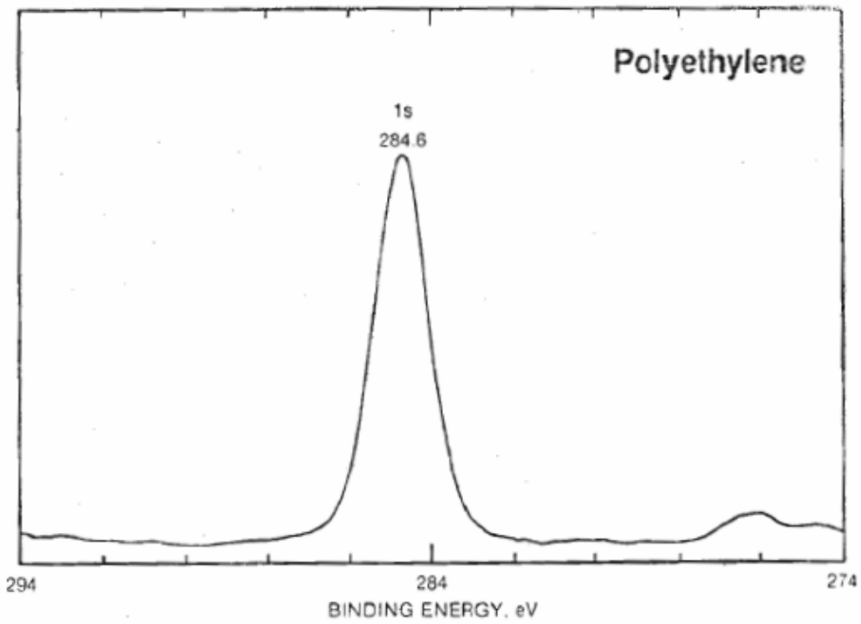
Handbook of X-ray photospectroscopy
John F. Moulder

XPS: Chemical identification
UPS: Valence electrons

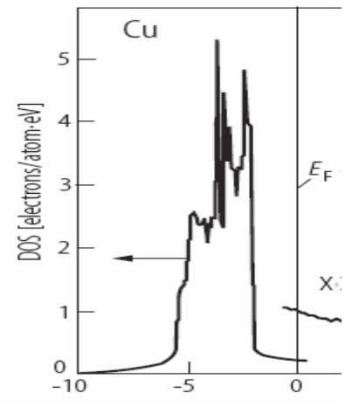
XPS

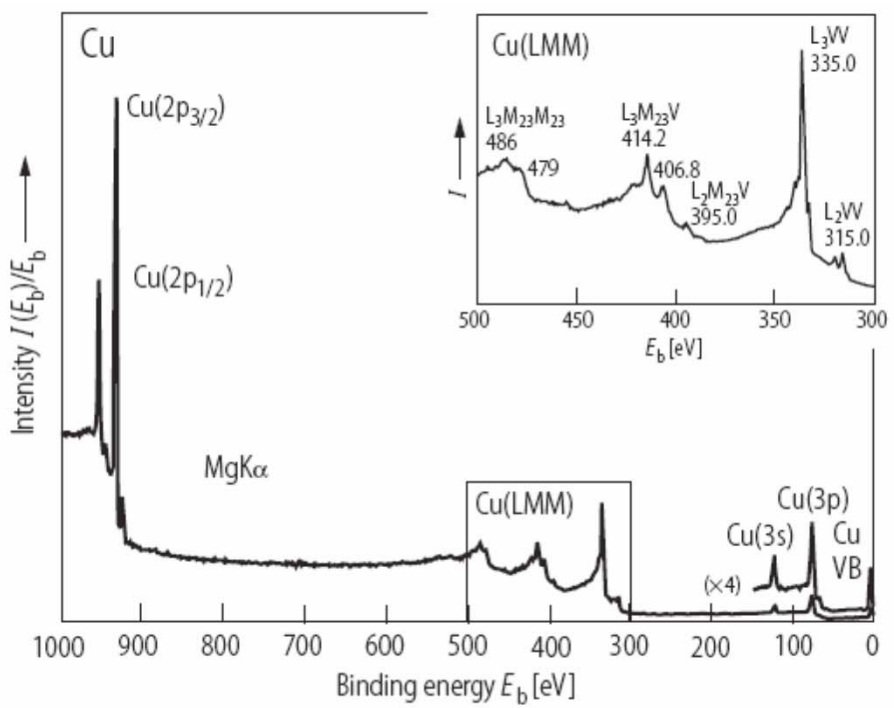
Carbon, C Atomic Number 6

COMPOUND	1s BINDING ENERGY, eV (280 / 284 / 288 / 292 / 296)	REF.
HfC		RH1
TiC		RH1
WC		RH1
C (graphite)		HJG
$(CH_2)_n$		Φ
$Mn(C_5H_5)_2$		BCD
$SnPh_4$		BAL
$MeCH_2NH_2$		GHH
$Cr(C_6H_6)_2$		PFD
$MeCH_2Cl$		GHH
$MeCH_2OH$		GHH
$MeCH_2OEt$		GHH
$MeCH_2OOCMe$		GHH
CS_2		GHH
$Fe(CO)_5$		BC1
Me_2CO		GHH
$(NH_2)_2CO$		GHH
C_6F_6		GHH
MeCOONa		GHH
MeCOOEt		GHH
MeCOOH		GHH
Na_2CO_3		GHH
$NaHCO_3$		GHH
CO		BC1
CO_2		GHH
$(CHFCH_2)_n$		CFK
$(CHFCHF)_n$		CFK
$(CHFCF_2)_n$		CFK
$(CF_2CH_2)_n$		CFK
$(CF_2CHF)_n$		CFK
$(CF_2)_n$		CFK
CF_3COONa		GHH
CCl_4		GHH
CF_3COMe		GHH
CF_3COOEt		GHH

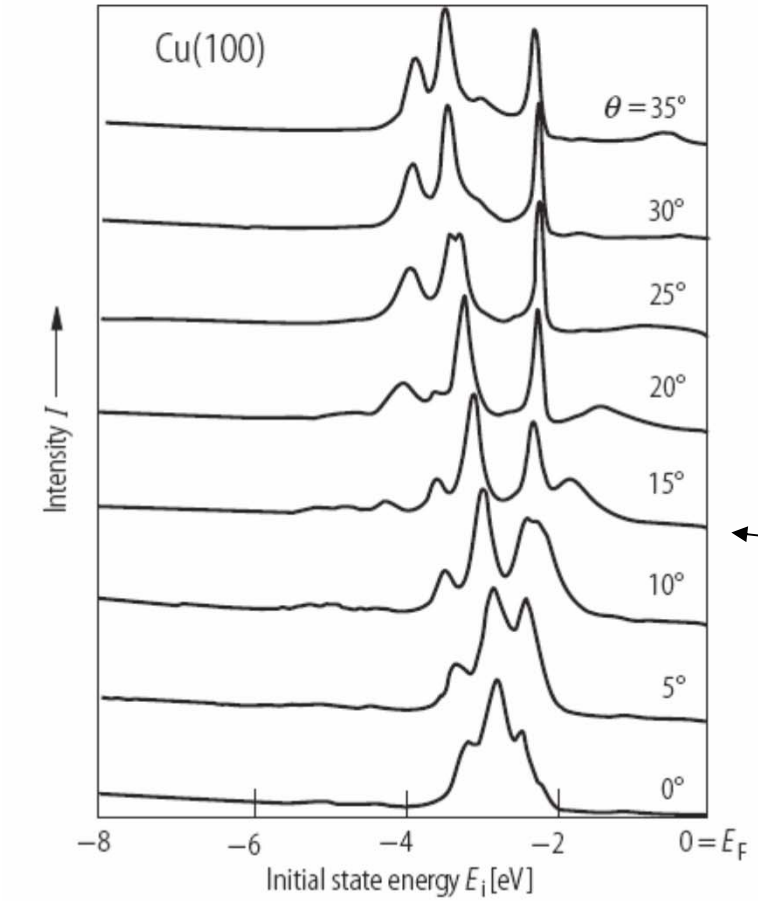


Cu





XPS



ARPES

Fig. 28. Cu(100). Angle-resolved photoelectron spectra taken at different polar angles θ along the ΓXUL bulk mirror plane. Photon energy $h\nu$ = 21.2 eV, sample temperature T = 50 K [93M1]. For further data taken at room temperature see [79H1]. For data taken with linear-polarized photons at $h\nu$ = 40° see [83G].