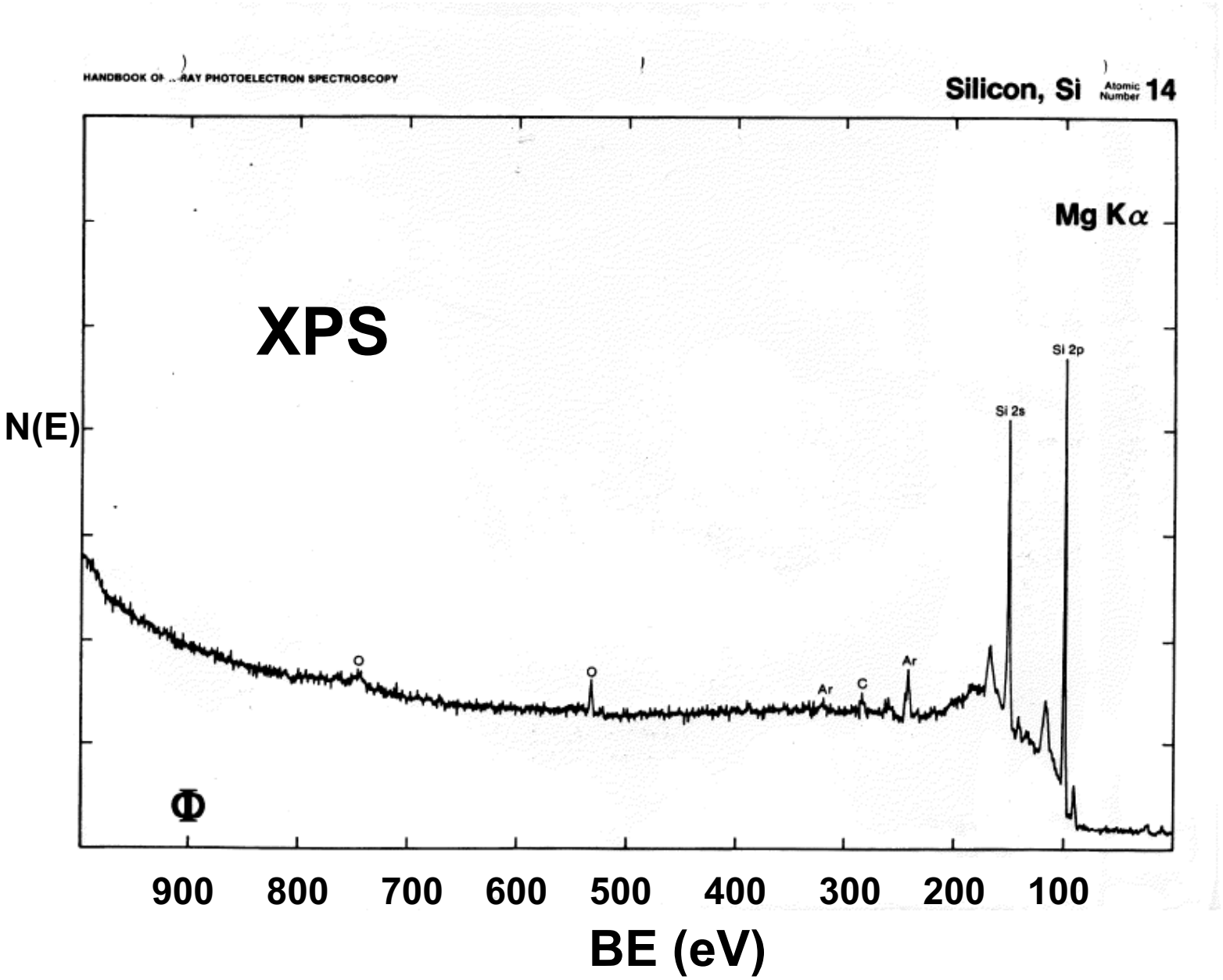
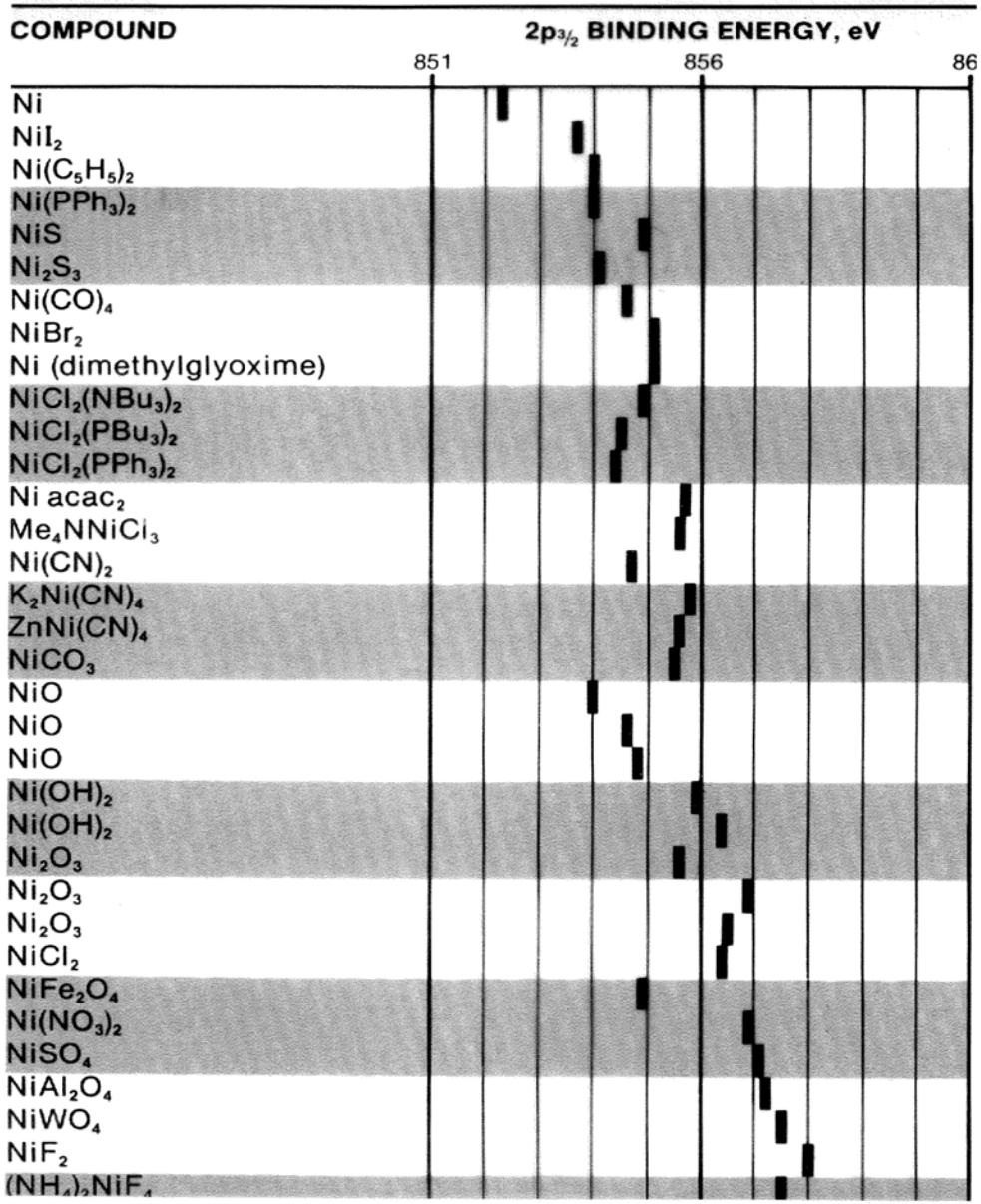

HANDBOOK OF ...RAY PHOTOELECTRON SPECTROSCOPY
Silicon, Si Atomic Number 14
Mg Kα
XPS
N(E)
Si 2p
Si 2s
O
O
Ar
C
Ar
Φ
900
800
700
600
500
400
300
200
100
BE (eV)

Nickel, Ni Atomic Number 28



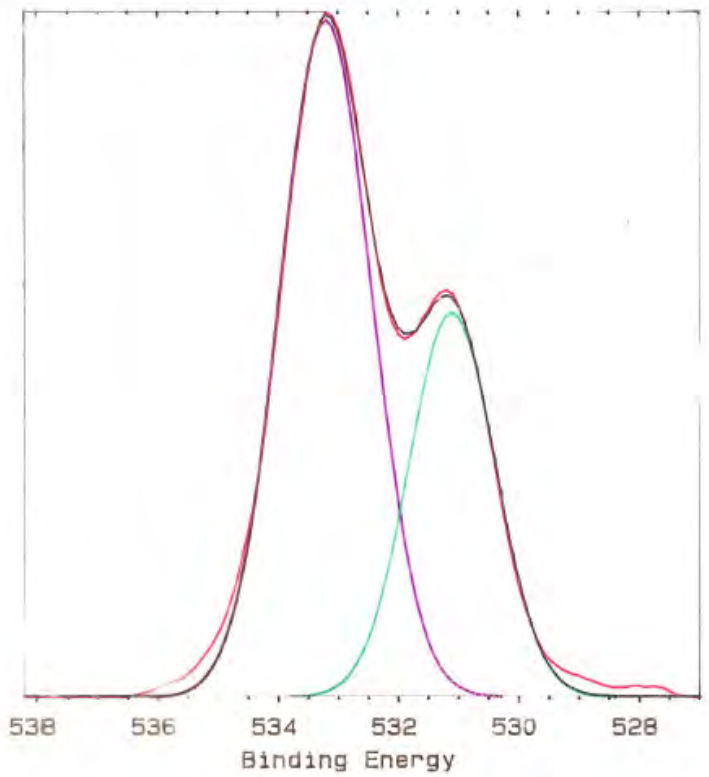
Run: NSN02 Reg: 1
Scan: 1 Chans: 113

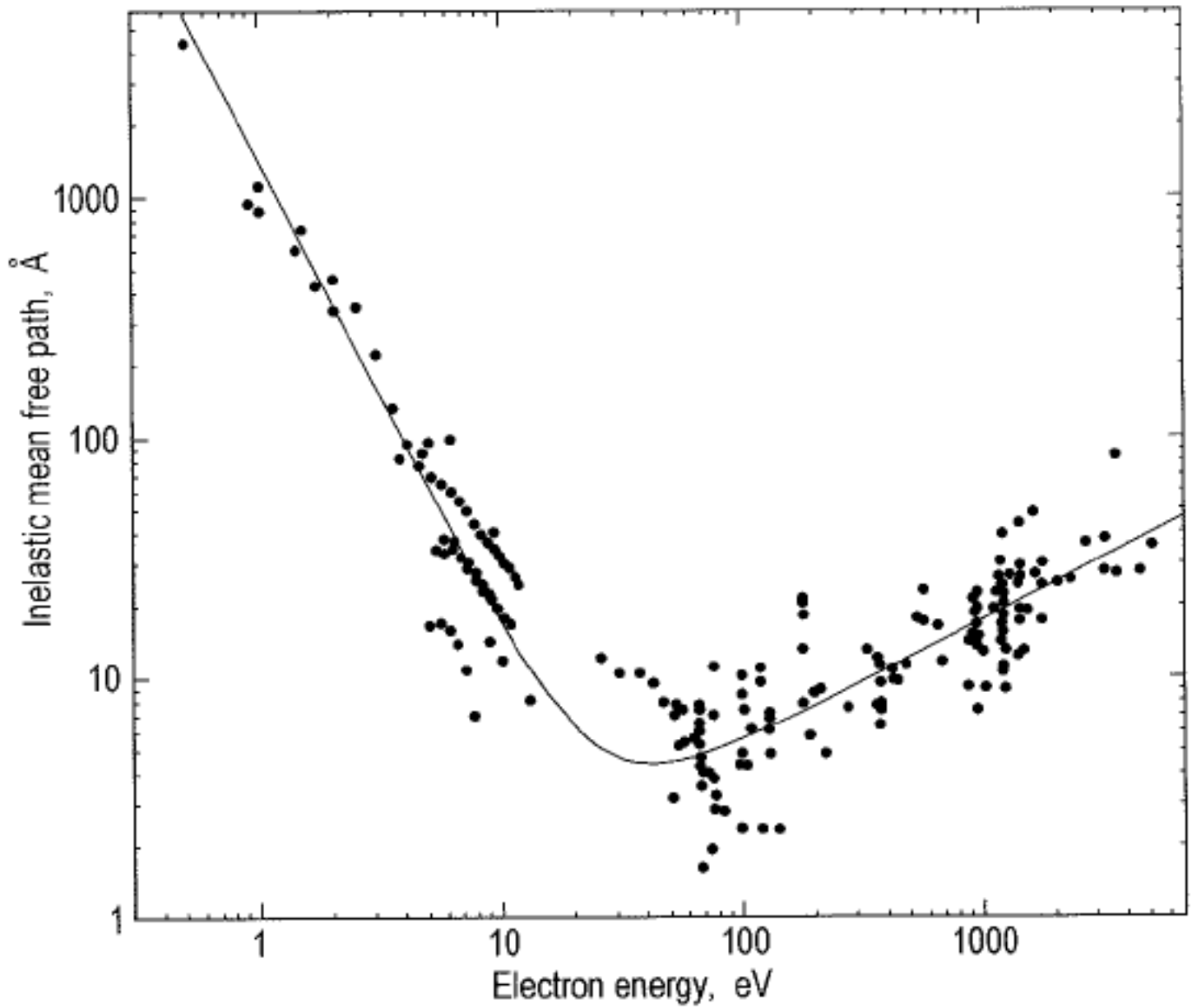
Start eV: 538.20
End eV: 527.00

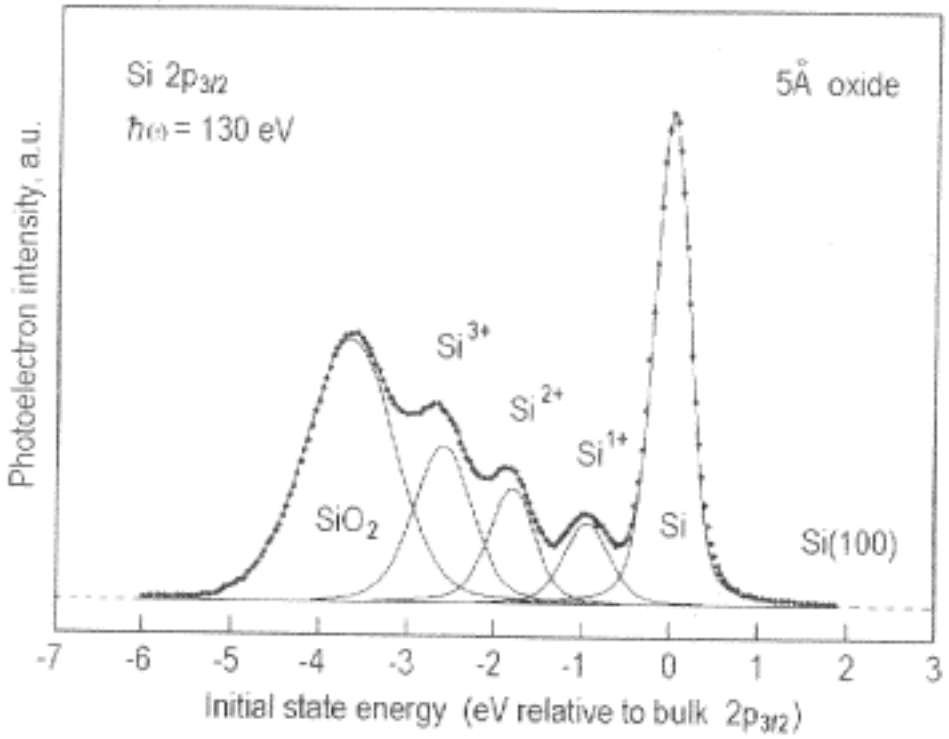
Fit: 1.4

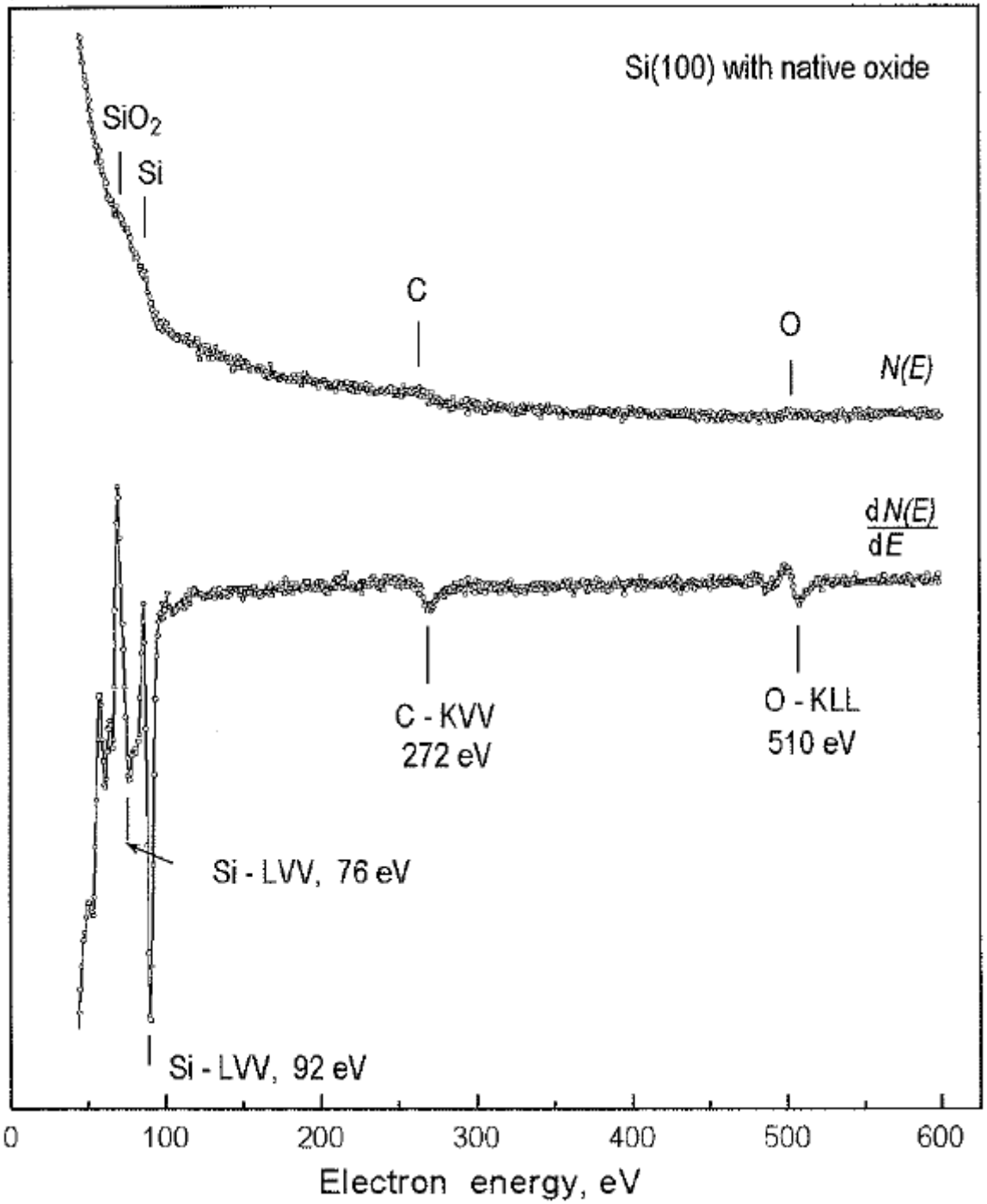
100% Intensity: 5736
100% Area: 169171

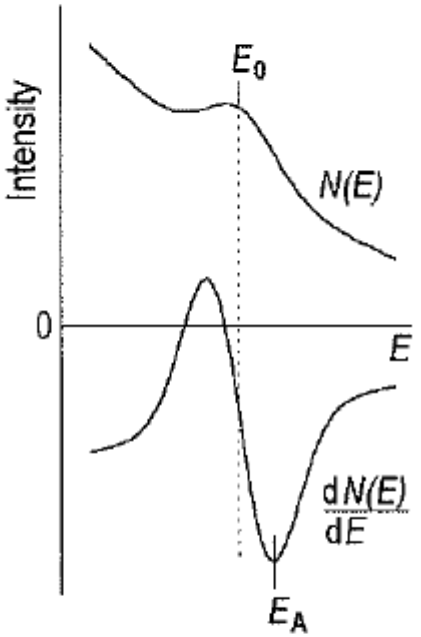
Line	Elmt.	Energy	Int.	FWHM	Area
GAUSS	o1s	531.1	56.1	1.7	34.1
GAUSS	o1s	533.2	98.8	1.8	63.5




Inelastic mean free path, Å
1000
100
10
1
1
10
100
1000
Electron energy, eV


Si 2p3/2
ħω = 130 eV
5Å oxide
Photoelectron intensity, a.u.
Si 3+
Si 2+
Si 1+
SiO2
Si
Si(100)
-7
-6
-5
-4
-3
-2
-1
0
1
2
3
Initial state energy (eV relative to bulk 2p3/2)


Si(100) with native oxide
SiO2
Si
C
O
N(E)
dN(E)/dE
C - KVV
272 eV
O - KLL
510 eV
Si - LVV, 76 eV
Si - LVV, 92 eV
0
100
200
300
400
500
600
Electron energy, eV


Intensity
E0
N(E)
0
E
dN(E)/dE
EA

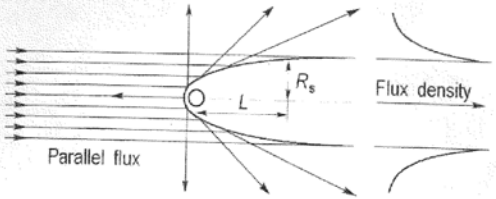


Fig. 6.6. Shadow cone formed from trajectories of projectile ions scattered from a target atom

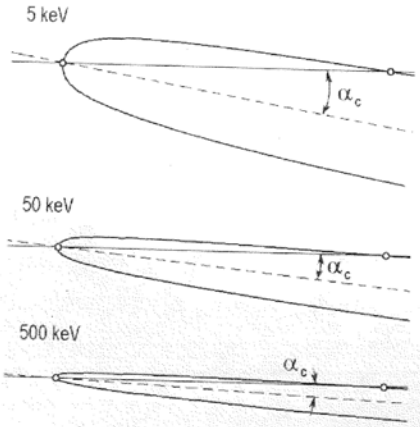


Fig. 6.7. Calculated shadow cones for Li^+ ions with energy of 5 keV, 50 keV, and 500 keV scattering from Ag atoms. The critical angles of shadowing α_c are indicated. The shadow cone width and critical angle decrease substantially with increasing ion kinetic energy (after Williams [6.3])

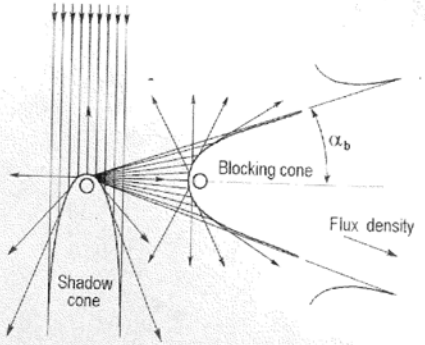


Fig. 6.8. Shadow and blocking cones for scattering from a pair of atoms

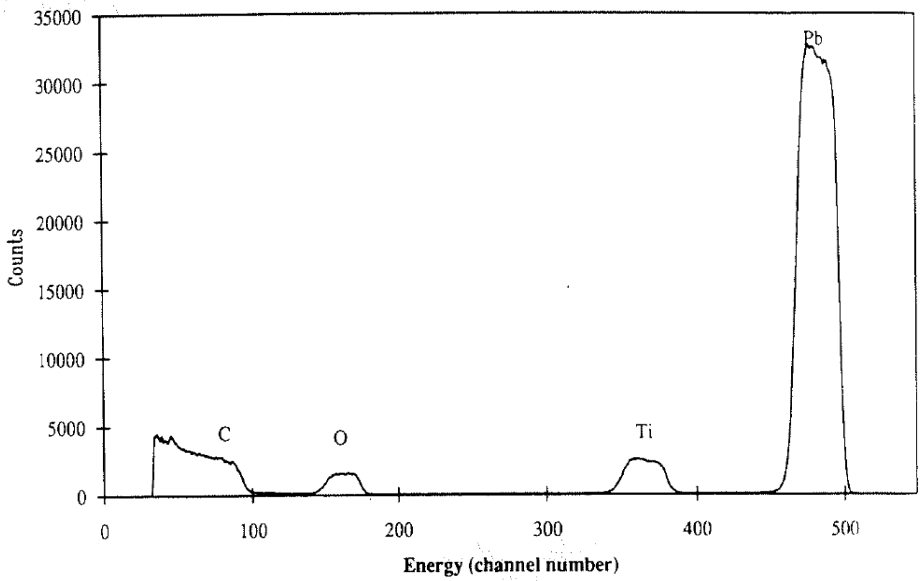
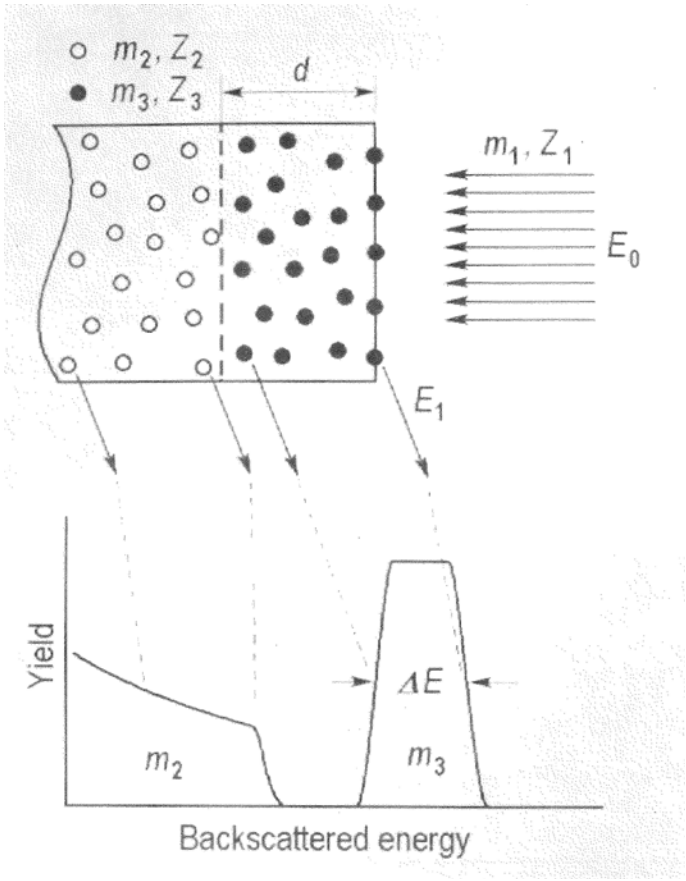


Figure 7.9 A Rutherford backscatter spectrum obtained from a specimen of carbon with a thin layer (110 nm) of $PbTiO_3$ deposited on it (Courtesy AEA Technology).


m_2, Z_2
m_3, Z_3
d
m_1, Z_1
E_0
E_1
Yield
ΔE
m_2
m_3
Backscattered energy

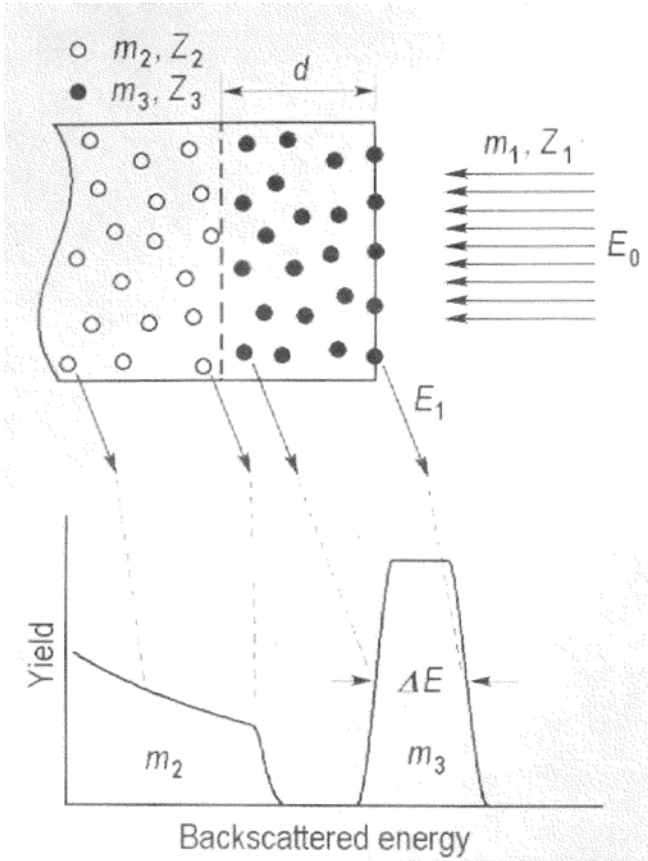


Fig. 6.28. Schematic diagram of the energy spectrum of ions (m_1, Z_1, E_0) scattered from a sample composed of a substrate (m_2, Z_2) and a film (m_3, Z_3) of thickness d. For simplicity, both film and substrate are assumed to be amorphous to neglect the structural effects. (after Feldman et al. [6.6])

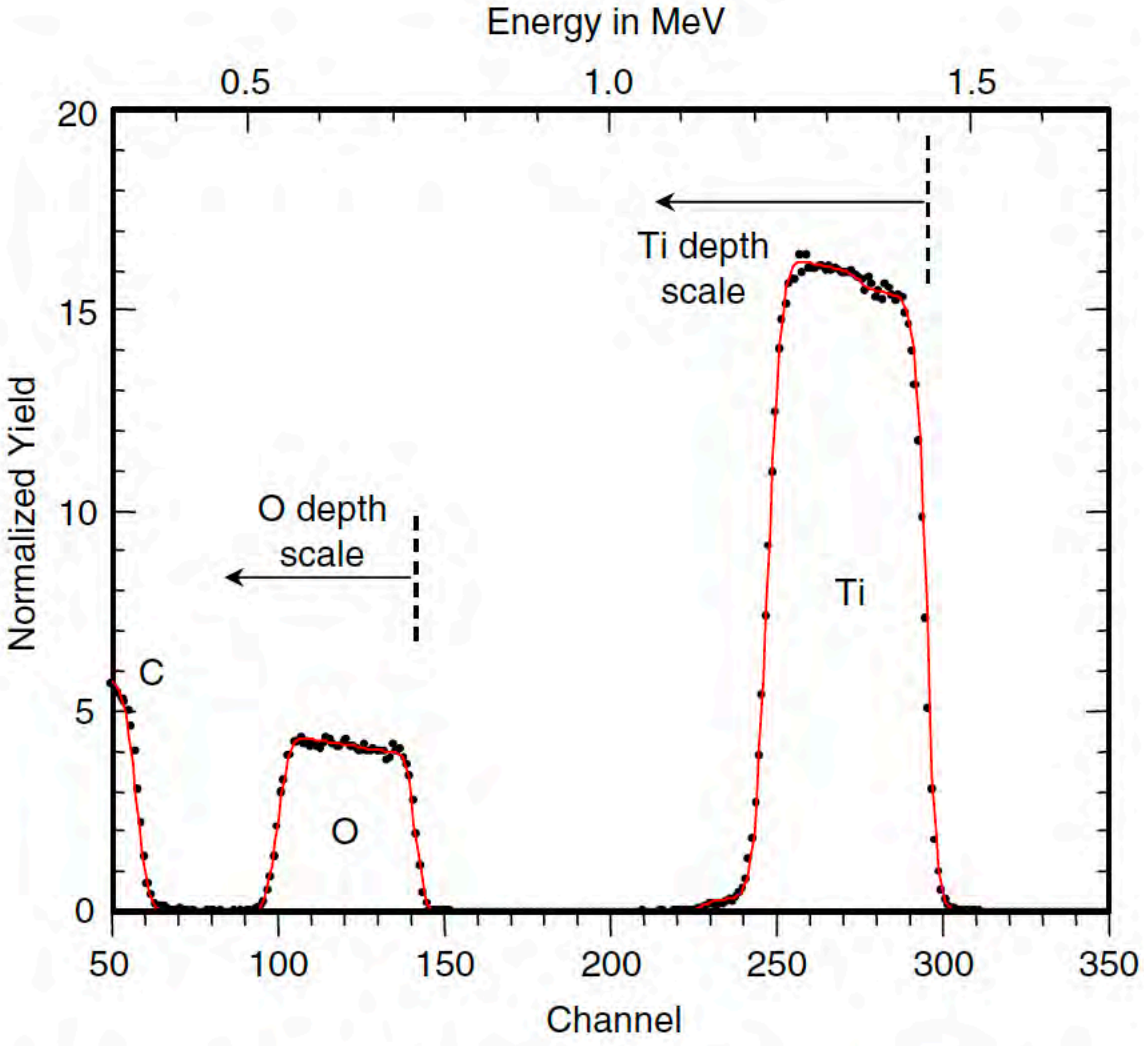


Figure 2. 2 MeV ^{4}He RBS spectrum of a 250 nm thick TiO_2 film on a carbon substrate. The solid line is a simulation [4]. Direction of depth scales for Ti and O concentration profiles is indicated by arrows.

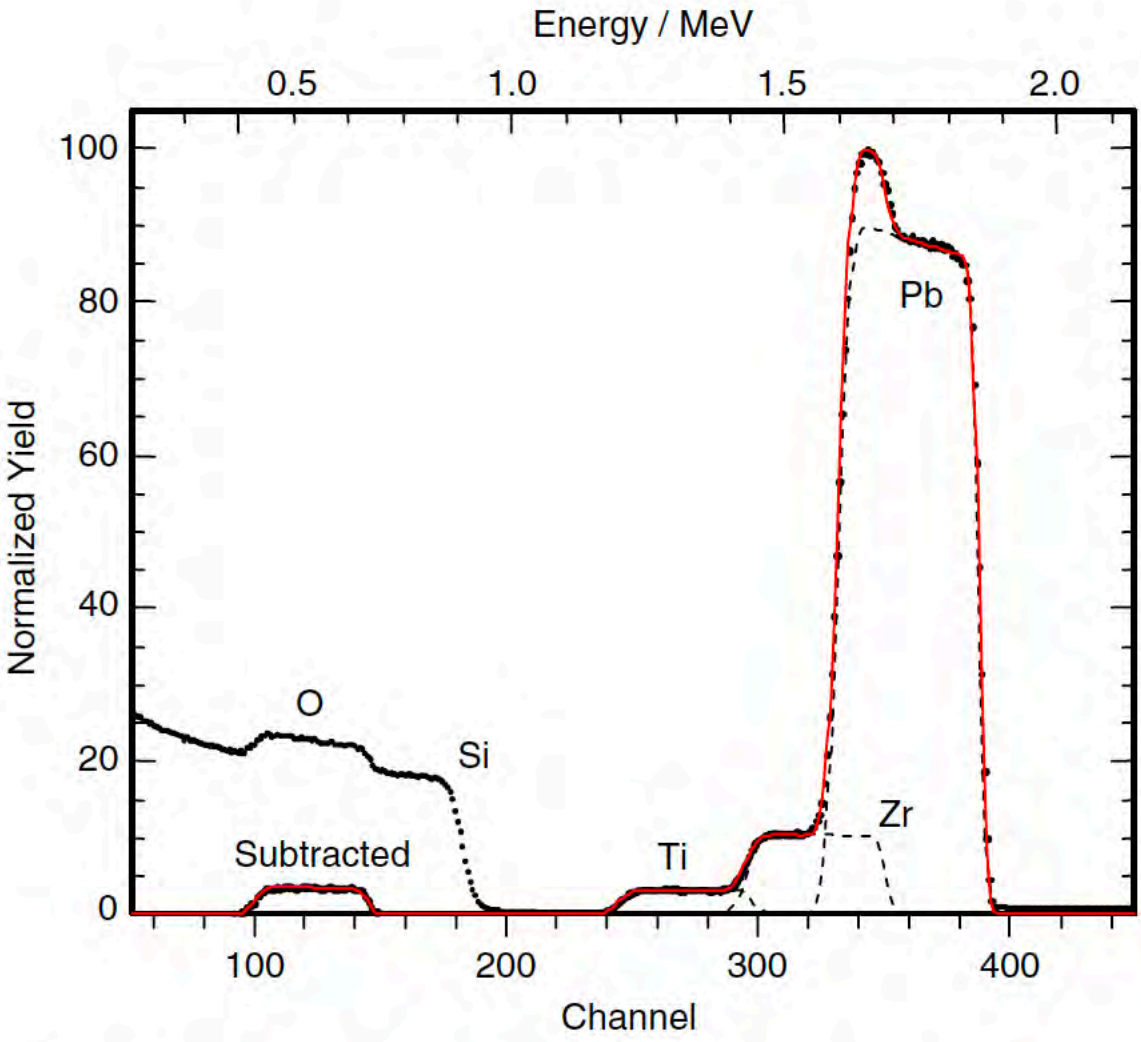


Figure 4. 2 MeV ^{4}He RBS spectrum of a 280 nm thick lead zirconate titanate (PZT) film on Si. The solid line is a RUMP [4] simulation. Dashed lines indicate the signals from individual elements as obtained by RUMP. The silicon substrate signal has been subtracted to obtain the oxygen spectrum. The composition as determined by the simulation is $PbZr_{0.480\pm0.015}Ti_{0.480\pm0.015}O_{3.09\pm0.09}$ with a thickness of (277 ± 9) nm.