EXAM XPS

Mounir Mensi

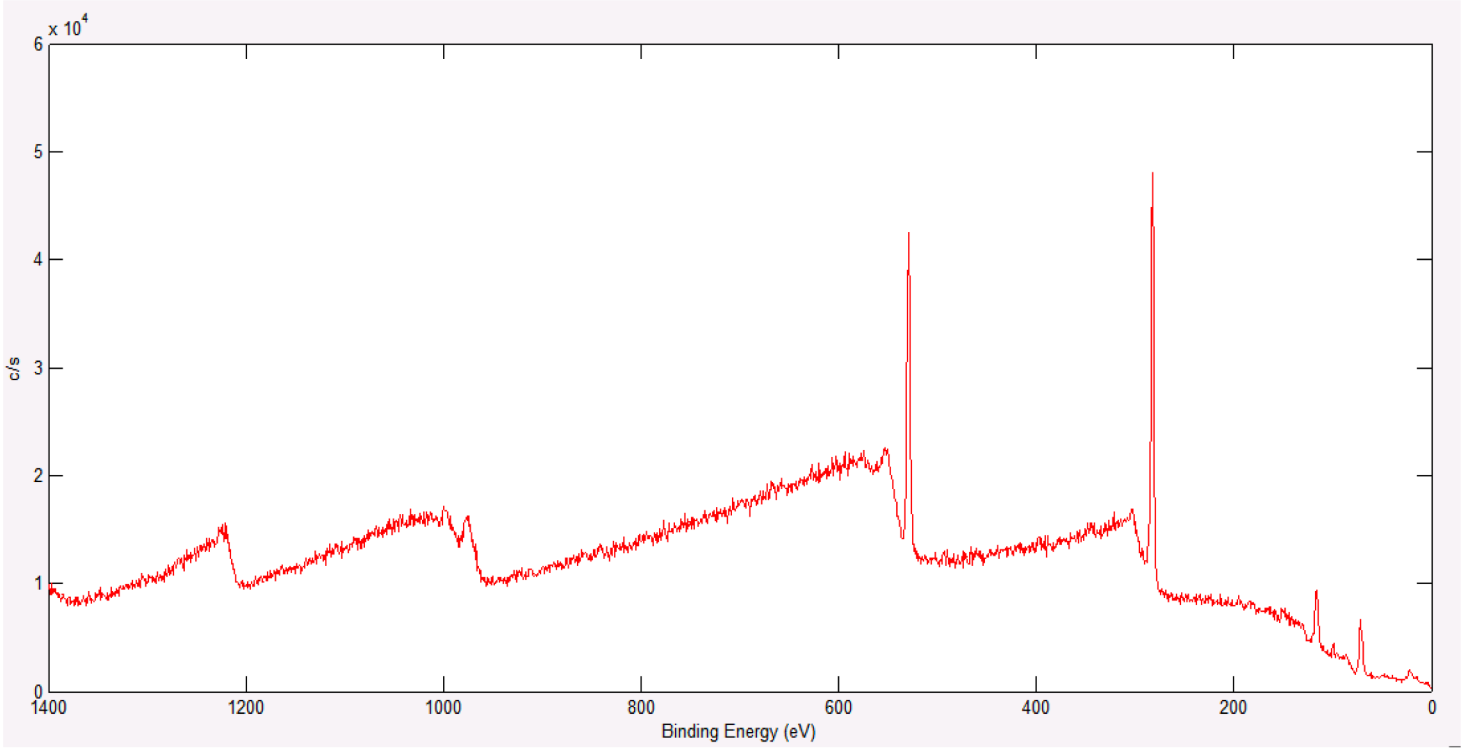
Question 1

An aluminium coating is measured using the Al Kα X-ray source (1486.6 eV) of an XPS. Native oxides and adventitious carbon contamination are expected.

1) On the survey below, assign the dominant photoelectron and Auger lines, and show the contribution of the secondary electrons

2) Briefly describe how the background is formed

3) Is there a way to shift the Auger peaks with respect to the photoelectron peaks?



	Photoelectrons BE, BE scale [eV]		
	1s	2s	2p
Carbon	285		
Oxygen	531	23	
Aluminium		118	73

	Auger transitions, Al Ka source, BE scale [eV]				
	KVV	KL1L1	KL1L23	KL23L23	L23M1M23
Carbon	1223				
Oxygen		1013	999	978	
Aluminium					1419

Question 2

During an XPS measurement, photoelectrons are emitted from the material being exposed to X-rays. These photoelectrons are said to reflect the surface properties of the material. In a couple of lines, explain why XPS is a surface sensitive technique, what is the parameter defining the ‘escape depth’ of the of the photoelectrons and what affect its value.

In a few sentences, explain what is the ‘XPS chemical shift’, what can it tell about the measured materials, and what are the limitations.