

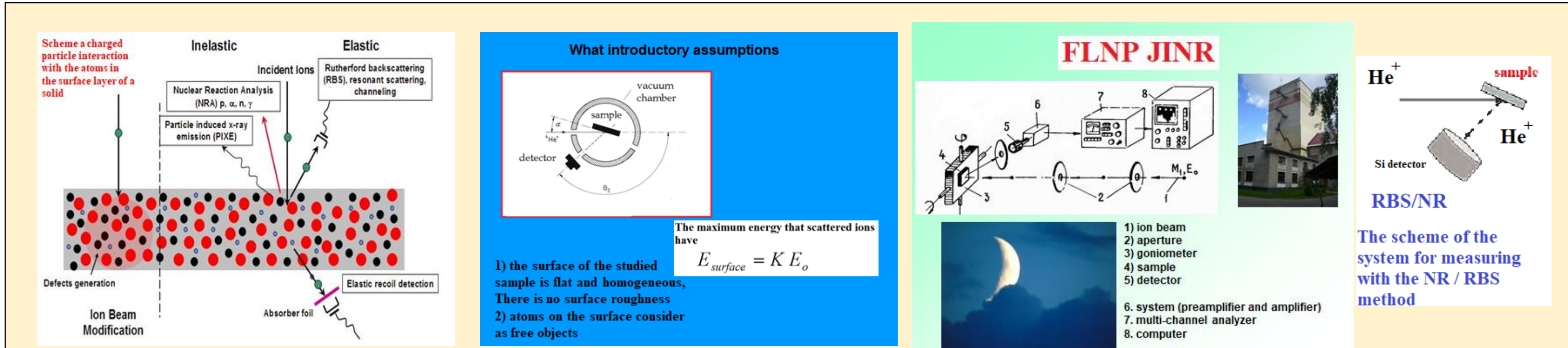
The presence of hydrogen and oxygen atoms in the near-surface layer of a solid

ERD and RBS/NR



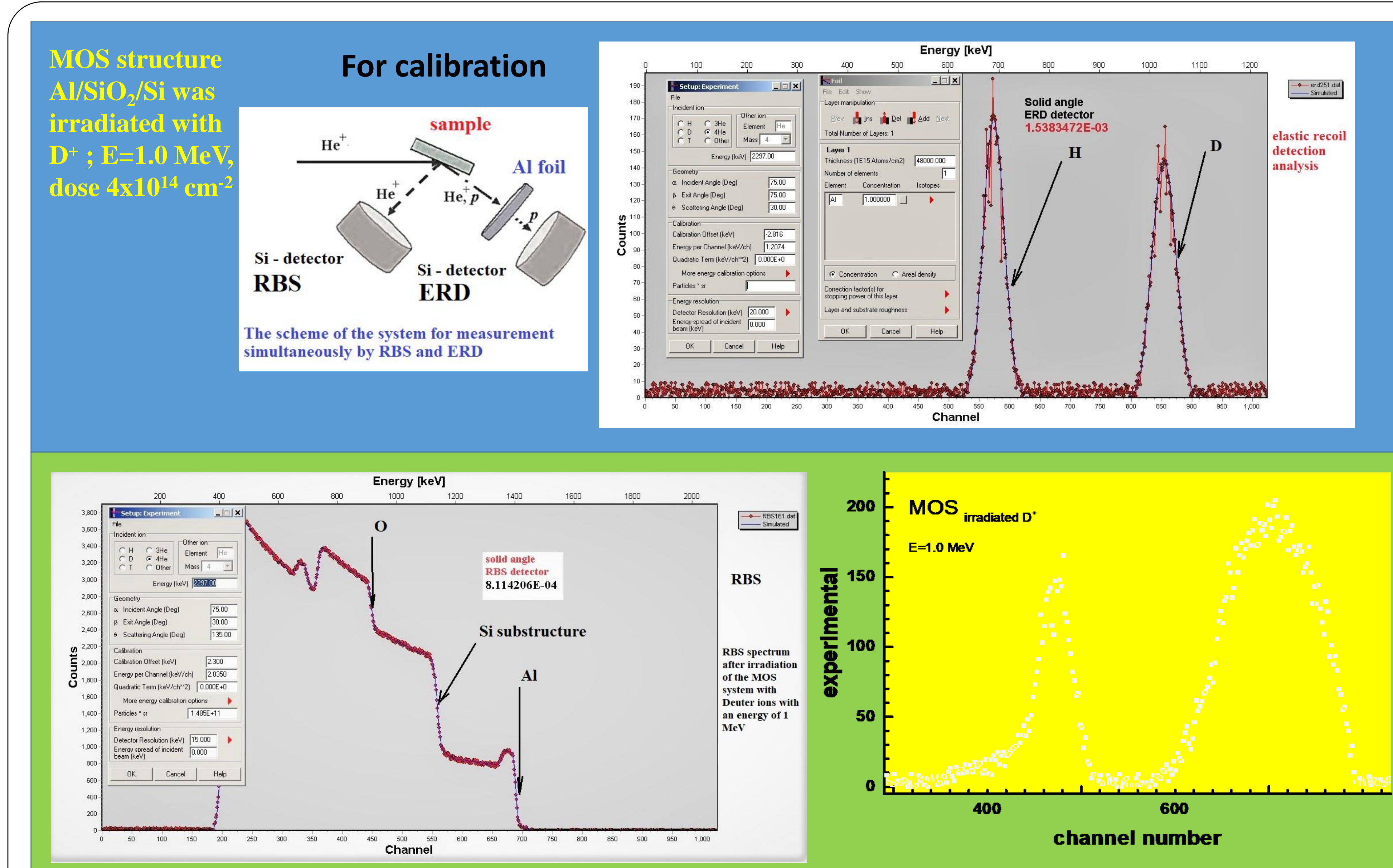
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Investigation of the presence of H and hydrogen isotopes

Elastic Recoil Detection Analysis, Patrick Trocellier, *Encyclopedia of Analytical Chemistry, Online © 2006–2008 John Wiley & Sons, Ltd. This article is © 2008 John Wiley & Sons, Ltd. This article was published in the Encyclopedia of Analytical Chemistry in 2008 by John Wiley & Sons, Ltd. DOI: 10.1002/9780470027318.a6205.pub2*



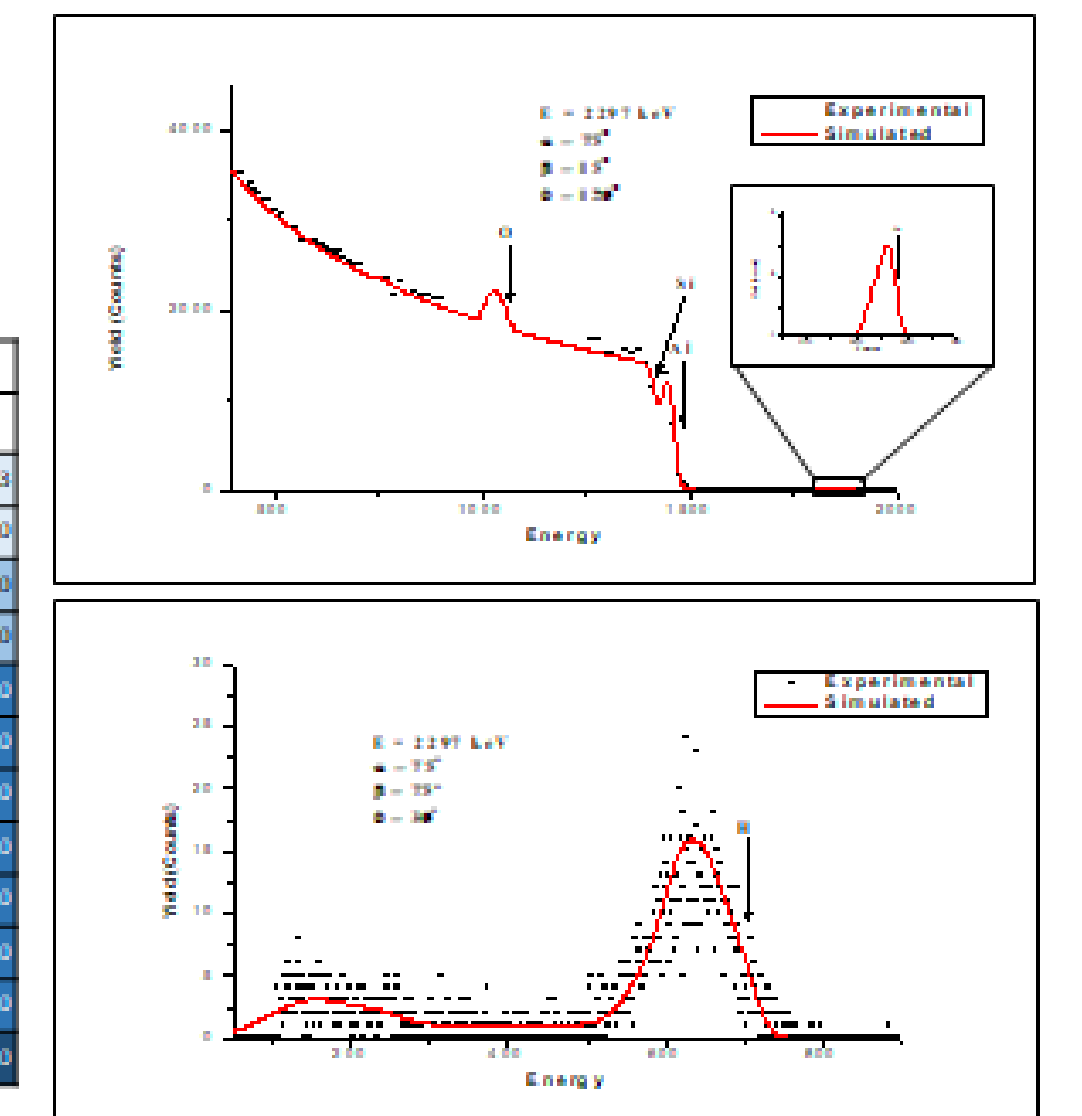
Investigated samples MOS_{vir}

Results

Sample 1: AB251 + AE11

Depth profile for elements in sample

Layer	Thickness (nm)	H	C	O	Al	Si	Cu
1	170	14.1	3.50	5.00	43.47	50.00	0.00
2	190	14.7	2.00	3.00	49.70	45.00	0.00
3	150	17.7	2.00	3.00	63.80	0.00	0.00
4	157	28.7	3.50	15.00	43.45	0.00	0.00
5	300	38.0	4.50	0.00	0.00	99.00	0.00
6	230	44.0	3.50	0.00	0.00	98.00	0.00
7	150	29.0	2.00	0.00	0.00	98.00	0.00
8	200	39.0	1.00	0.00	0.00	99.00	0.00
9	1400	278.0	0.00	0.00	0.00	99.00	0.00
10	250	49.0	0.70	0.00	0.00	99.00	0.00
11	300	59.0	3.00	0.00	0.00	99.00	0.00
12	4000	796.0	0.00	0.00	0.00	99.00	0.00

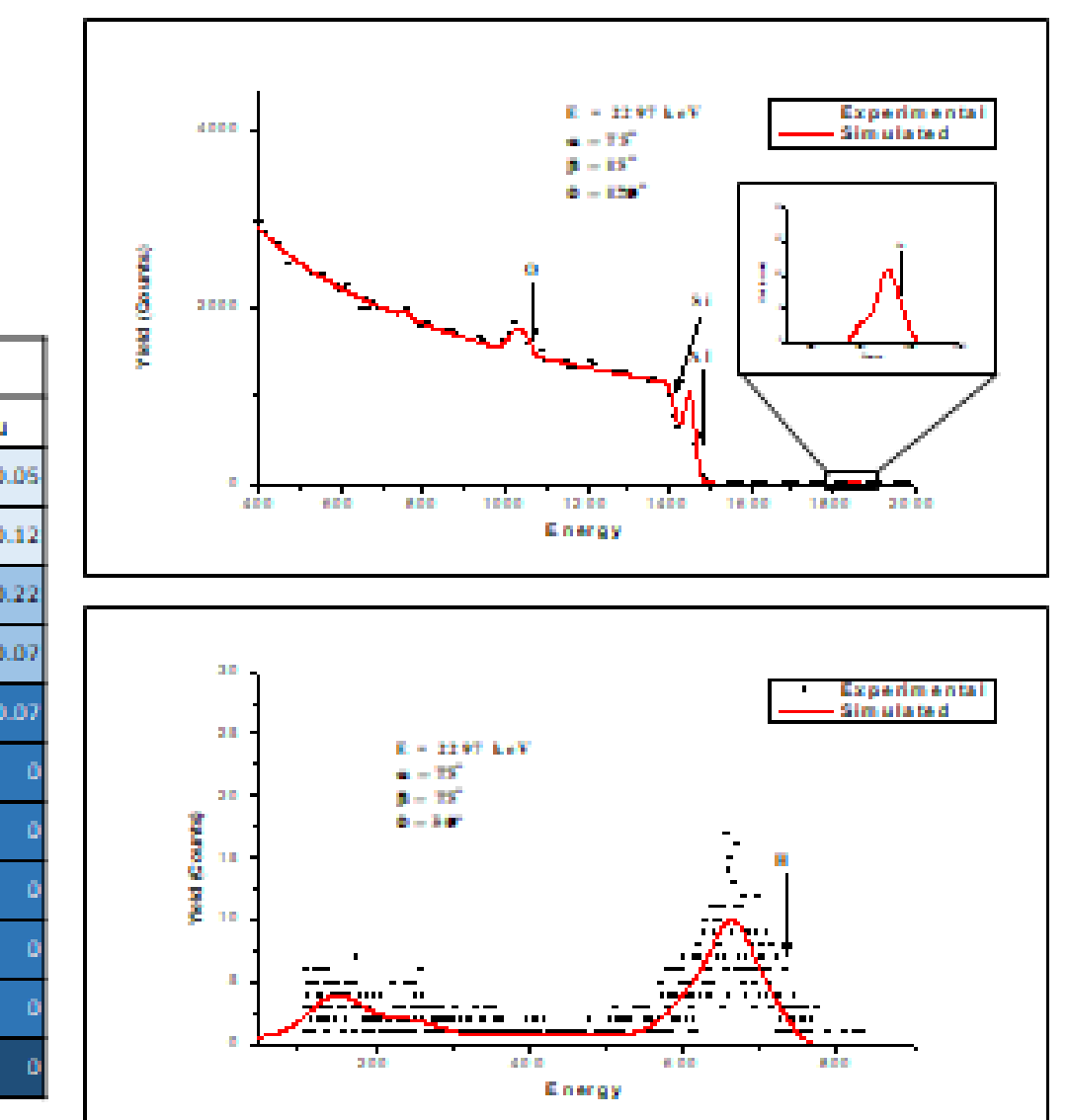


Results

Sample 2: AB242 + AE107

Depth profile for elements in sample

Layer	Thickness (nm)	H	C	O	Al	Si	Cu
1	50	4.0	0.70	1.00	47.25	51.00	0.00
2	152	12.2	0.85	2.00	48.00	49.00	0.00
3	211	25.5	1.50	2.00	57.28	0.00	0.00
4	170	20.0	2.50	31.43	25.00	0.00	0.00
5	120	24.7	4.50	0.00	0.00	99.00	0.00
6	260	50.0	2.00	0.00	0.00	98.00	0.00
7	220	43.5	1.00	0.00	0.00	99.00	0.00
8	1400	278.0	0.00	0.00	0.00	99.00	0.00
9	400	83.2	0.80	0.00	0.00	99.00	0.00
10	180	35.2	2.10	0.00	0.00	99.00	0.00
11	300	59.0	0.00	0.00	0.00	99.00	0.00
12	4000	796.0	0.00	0.00	0.00	99.00	0.00

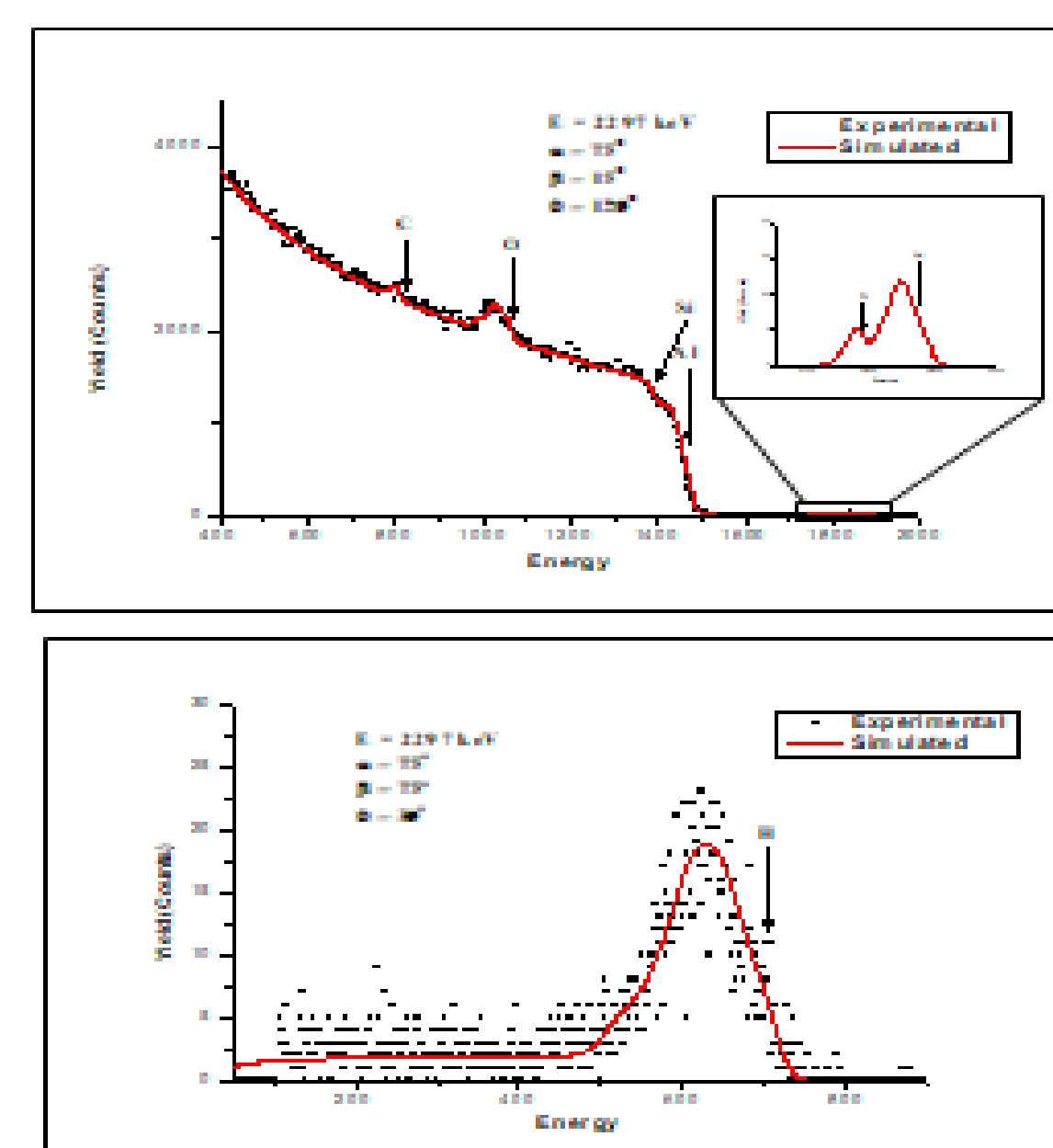


Results

Sample 3: AB239 + AE103

Depth profile for elements in sample

Layer	Thickness (nm)	H	C	O	Al	Si	Ti	Cu
1	70	3.7	1.00	53.78	32.00	13.00	0.00	0.00
2	190	12.3	1.80	22.00	43.00	15.00	0.00	0.00
3	80	9.5	2.00	0.00	65.00	0.00	0.00	0.00
4	70	8.6	2.50	0.00	49.40	0.00	0.00	0.00
5	170	23.6	4.30	0.00	26.10	0.00	0.00	0.00
6	100	15.0	4.50	0.00	20.50	0.00	0.00	0.00
7	200	36.3	4.60	0.00	4.40	0.00	0.00	0.00
8	200	37.9	2.50	0.00	2.50	0.00	0.00	0.00
9	300	57.9	1.50	0.00	2.00	0.00	0.00	0.00
10	200	38.9	0.51	0.00	2.00	0.00	0.00	0.00
11	4000	794.4	0.51	0.00	0.00	0.00	0.00	0.00

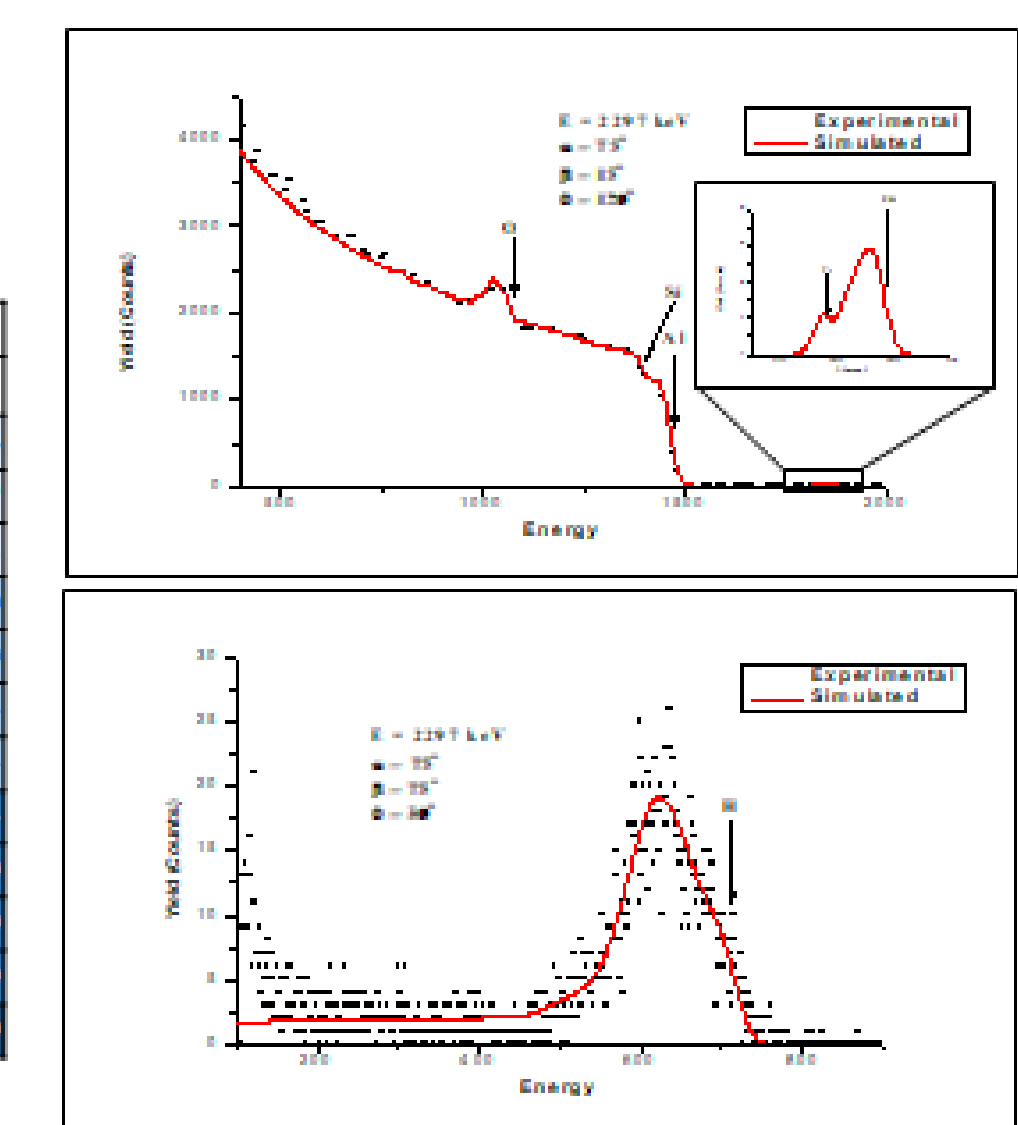


Results

Sample 4: AB242 + AE105

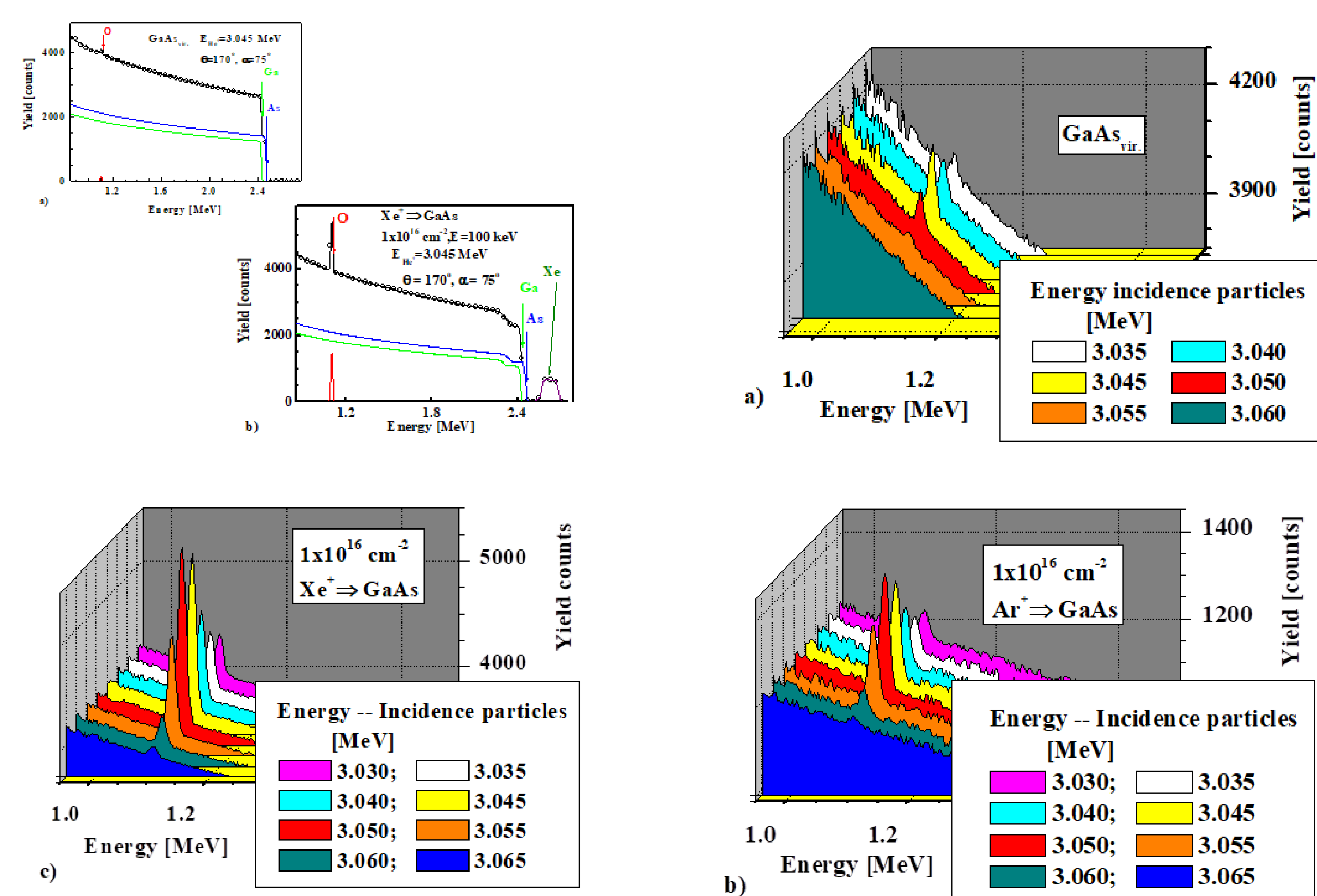
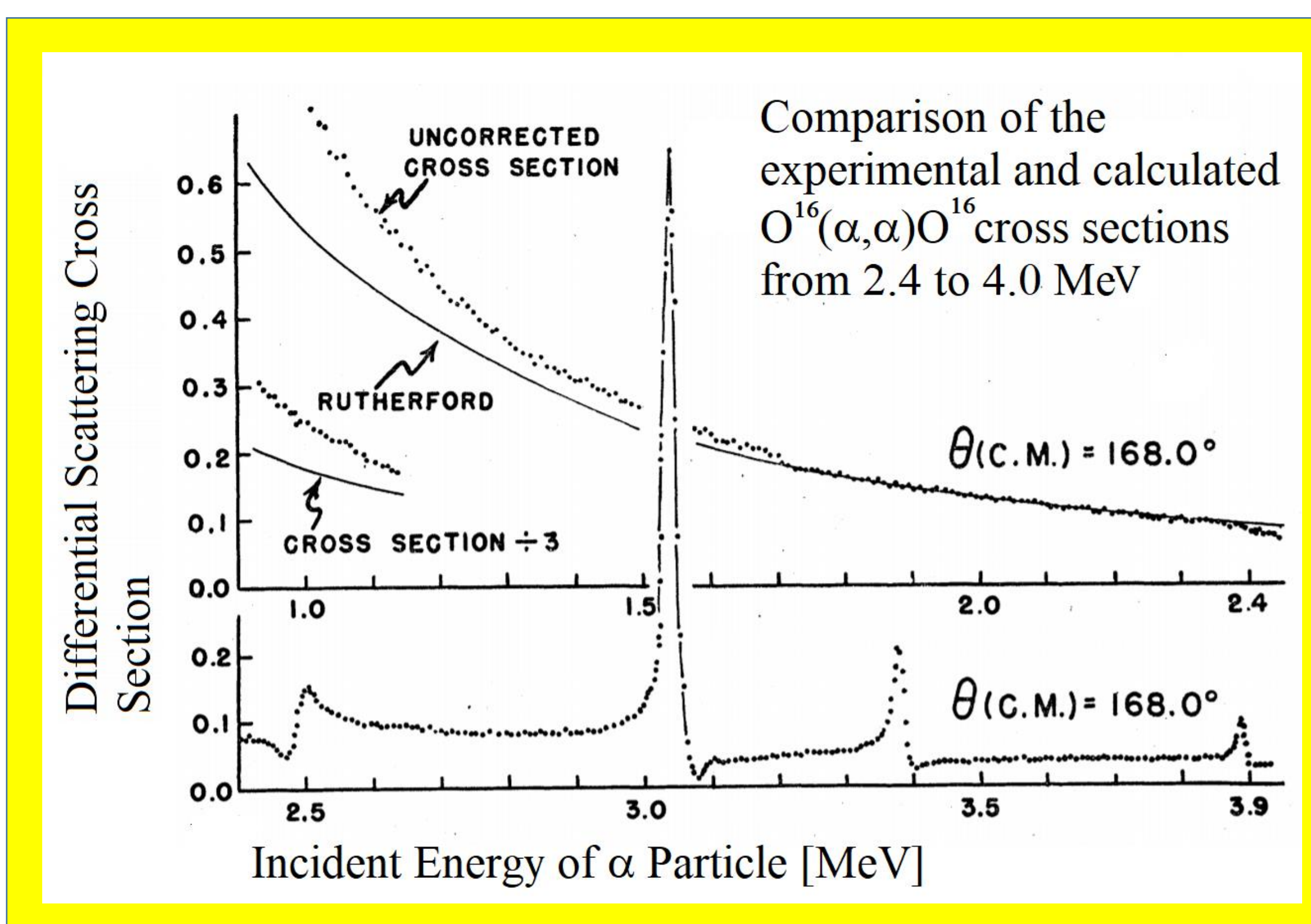
Depth profile for elements in sample

Layer	Thickness (nm)	H	C	O	Al	Si	Ti	Cu
1	95	6.7	2.50	28.35	49.00	20.00	0.00	0.00
2	88	7.8	2.00	6.83	40.00	30.00	0.00	0.00
3	120	10.0	2.00	11.70	40.00	25.00	0.00	0.00
4	108	12.3	2.20	0.00	67.86	0.00	0.00	0.00
5	70	6.7	2.80	0.00	49.10	0.00	0.00	0.00
6	150	21.0	4.00	0.00	25.86	0.00	0.00	0.00
7	95	13.3	4.50	0.00	22.44	0.00	0.00	0.00
8	200	36.7	5.00	0.00	2.96	0.00	0.00	0.00
9	200	38.2	2.80	0.00	1.50	0.00	0.00	0.00
10	300	57.3	1.10	0.00	8.20	0.00	0.00	0.00
11	200	38.5	0.80	0.00	2.70	0.00	0.00	0.00
12	4000	792.4	0.51	0.00	0.00	0.00	0.00	0.00



Study of oxygen atoms in the surface layers

The presence of oxygen atoms in the surface layers was determined by the NR method [J.R. Cameron "Elastic Scattering of Alpha-Particles by Oxygen", Phys. Rev 90 (1953) 839- 844]



REFERENCES

- [1] W.K. Chu, J.W. Mayer and M.A. Nicolet, 1978. *Backscattering Spectrometry*, Academic Press, New York.
 [2] M. Mayer, 1997. *SIMNRA User's Guide*, Report IPP 9/113, Max-Planck-Institut für Plasmaphysik, Garching, Germany.

Increase in the thickness of the natural oxide layer after ion implantation. The thickness of the layer depends on the degree of damage