

RBS analysis of Ti deposited on glassy carbon at CERN

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- Shift name: ANT
- Date: 26/3/25
- Beam: $^4\text{He}^+$
- Beam nominal energy: 1.6 MeV
- Scattering angle: $\theta_{\text{RBS}}=160^\circ$
- Incident angle: 0°
- Beam current: 45-50 nA
- Beam spot: $\sim 1 \text{ mm}^2$
- Analysed samples: 9
- 3 RBS analyses per sample (Fig. 1)

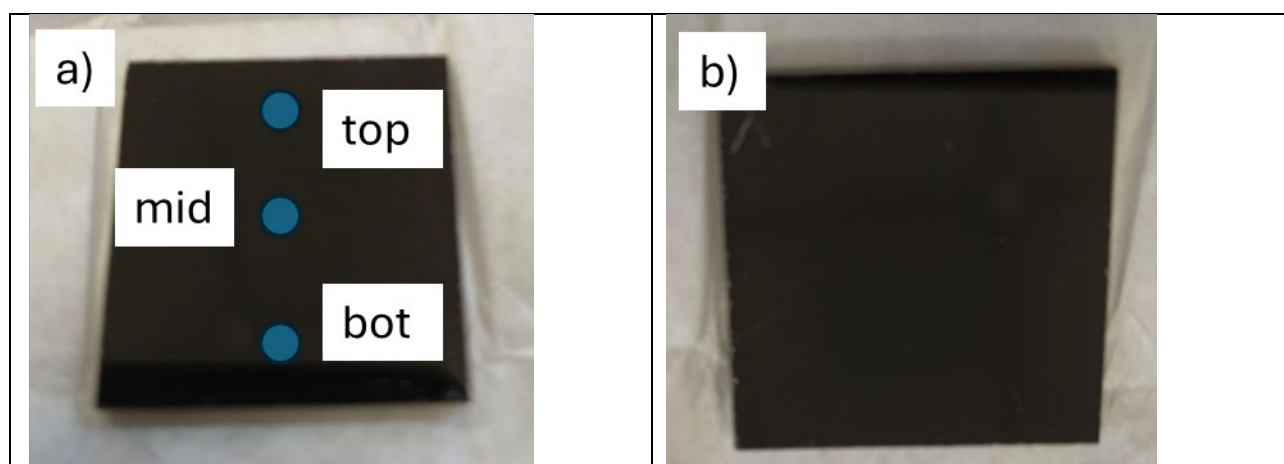


Fig. 1: a) front view with measured points, b) rear view of sample with marker.

- Each sample has been measured in 3 different points (Fig.1a), all samples have been positioned with “X” markers related to the “top” position (Fig.1b).
- The distance between the measured points is about 9 mm.

- The calculated thickness value is the mean value of the 3 RBS measurements, deduced from the measured Titanium content (10^{15} at/cm²) assuming the Ti nominal density.
- Ti is fully oxidised with stoichiometry TiO₂ (Fig. 2, Table 1)
- The GC_center (GCC) sample Titanium thickness has been used for thickness normalization. Relative thicknesses are reported in Fig. 3 and Table 1.

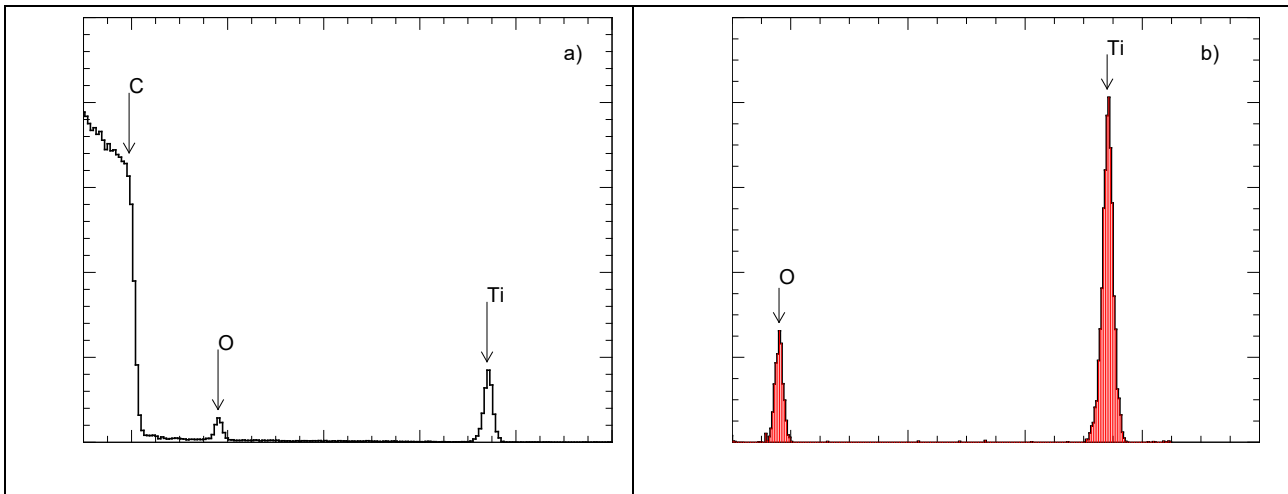


Fig. 2. a) RBS spectrum (GCC sample) of TiO₂/C; b) enlarged spectral region of Oxygen and Titanium.

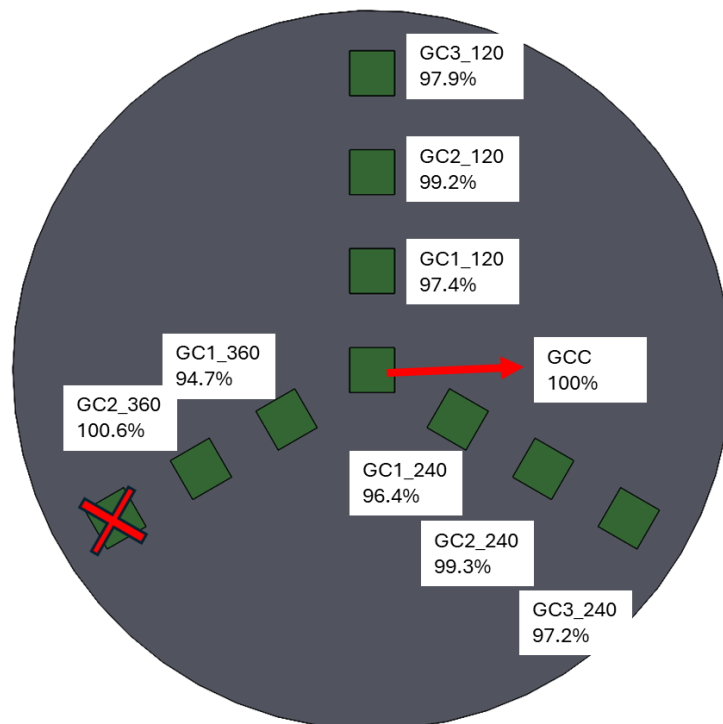


Fig. 3. Ti thickness homogeneity

	Ti dose (10^{15}at/cm²)	Ti equivalent thckness (nm)	Error % Ti dose	Relative thickness (%)	O dose (10^{15}at/cm²)	Error % O dose	Stoichiometry (O/Ti)
GCC (center)	7.3	1.28	1.2	100.0	14.8	1.8	2.0
GC_1_120	7.1	1.25	1.6	97.4	13.8	2.5	1.9
GC_1_240	7.0	1.23	1.6	96.4	13.7	2.4	2.0
GC_1_360	6.9	1.21	1.3	94.7	14.5	2.1	2.1
GC_2_120	7.2	1.27	1.3	99.2	14.9	2.1	2.1
GC_2_240	7.2	1.27	1.2	99.3	15.4	1.9	2.1
GC_2_360	7.3	1.29	1.4	100.6	14.5	2.2	2.0
GC_3_120	7.1	1.25	1.2	97.9	14.9	1.8	2.1
GC_3_240	7.1	1.24	1.3	97.2	15.1	2.0	2.1

Table 1. RBS Ti and Oxygen contents summary.