Effect of ion irradiation of solid surfaces and multilayer structures for the formation of the transition regions at the borders of semiconductor dielectric and the definition of their properties:optical, chemical composition and atoms

M.Kulik [1,2], J. Żuk [2], M. Turek [2], A. Droździel [2], K. Pyszniak [2] and J. Filiks [2]; Z. Hubicki [3], D. Kołodyńska [3],; ITE H.M. Przewłocki [4],; Wydział Inżynierii Metali i Informatyki Przemysłowej, J. Nowicka-Scheibe[5],;

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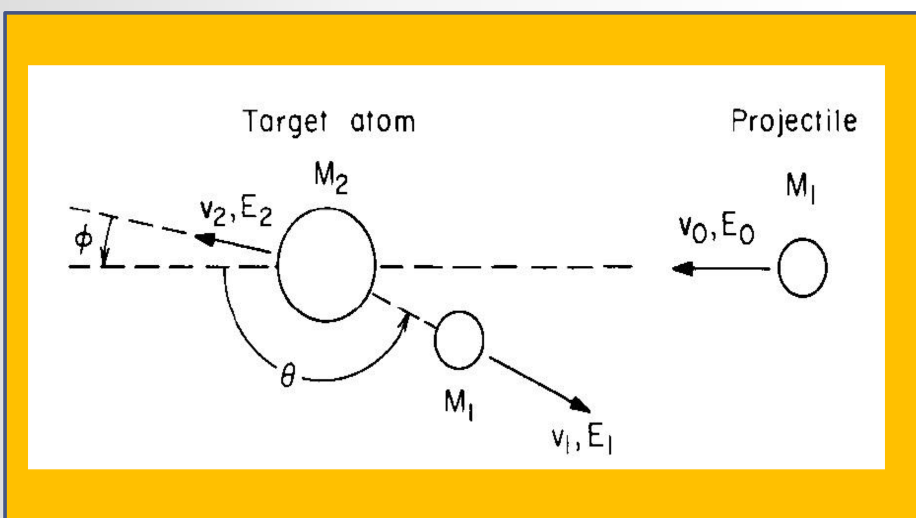
Multilayer systems and semiconductors

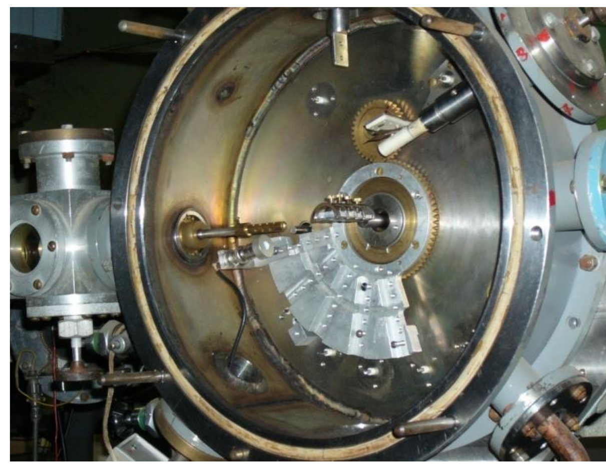
RBS - exp



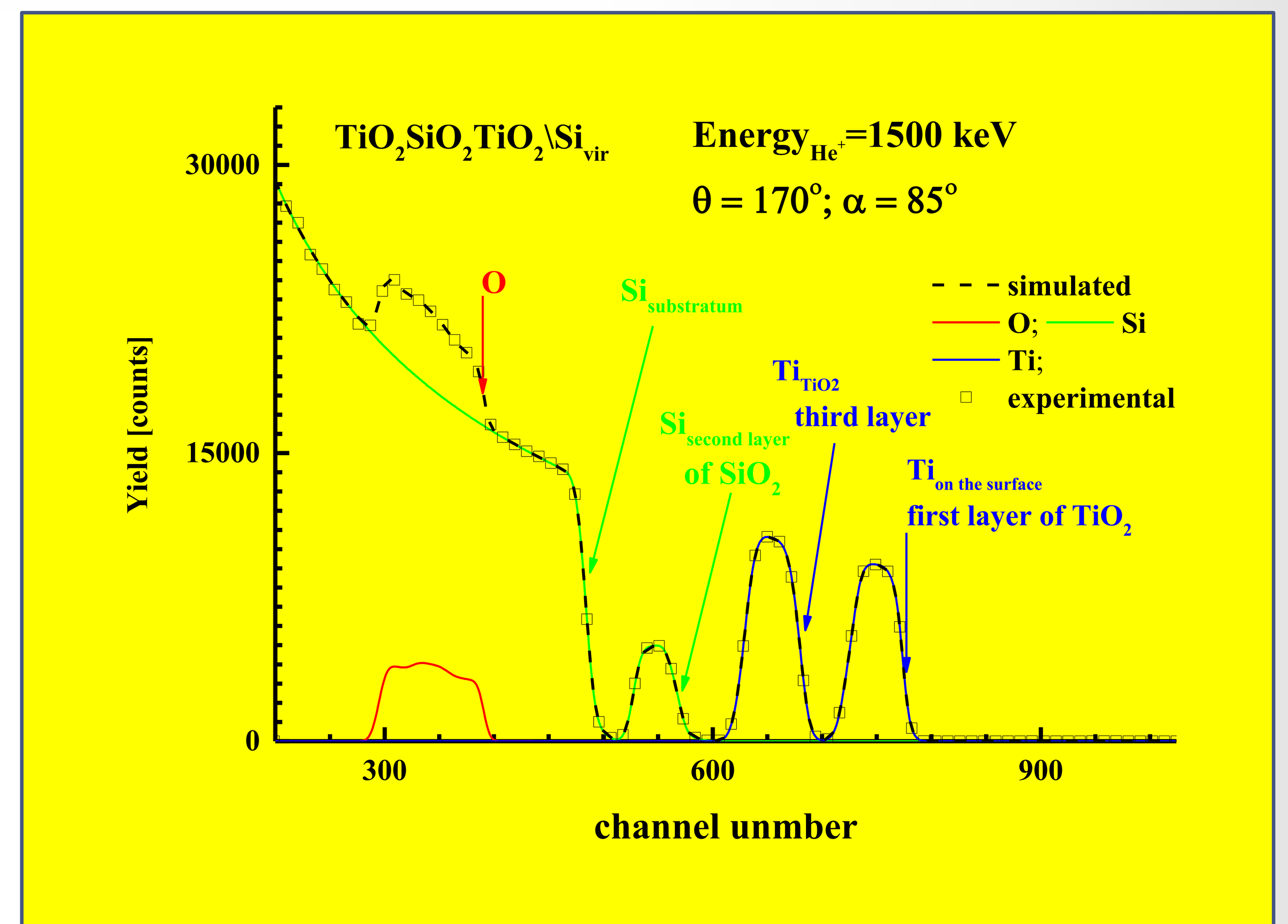
$$\tfrac{1}{2}M_1 v_0^{\,2} = \tfrac{1}{2}M_1 v_1^{\,2} + \tfrac{1}{2}M_2 v_2^{\,2},$$
$$M_1 v_0 = M_1 v_1 \cos\theta + M_2 v_2 \cos\phi,$$
$$0 = M_1 v_1 \sin\theta - M_2 v_2 \sin\phi.$$

EG-5

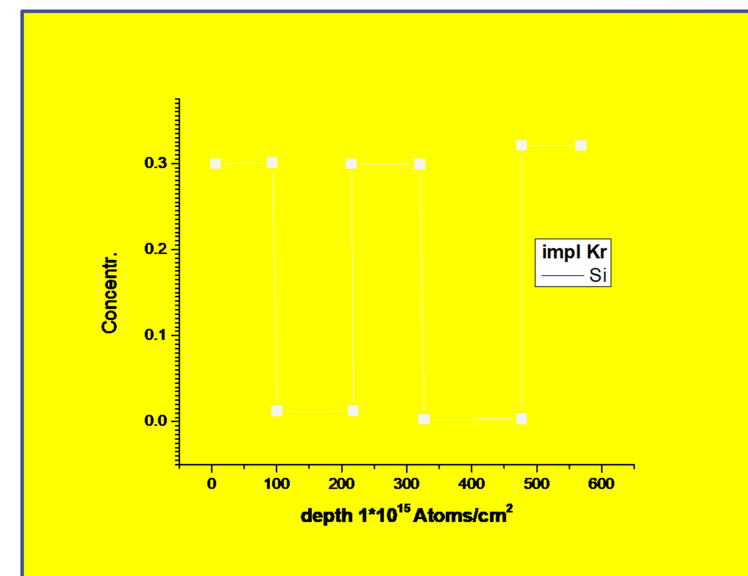
SIMNRA code



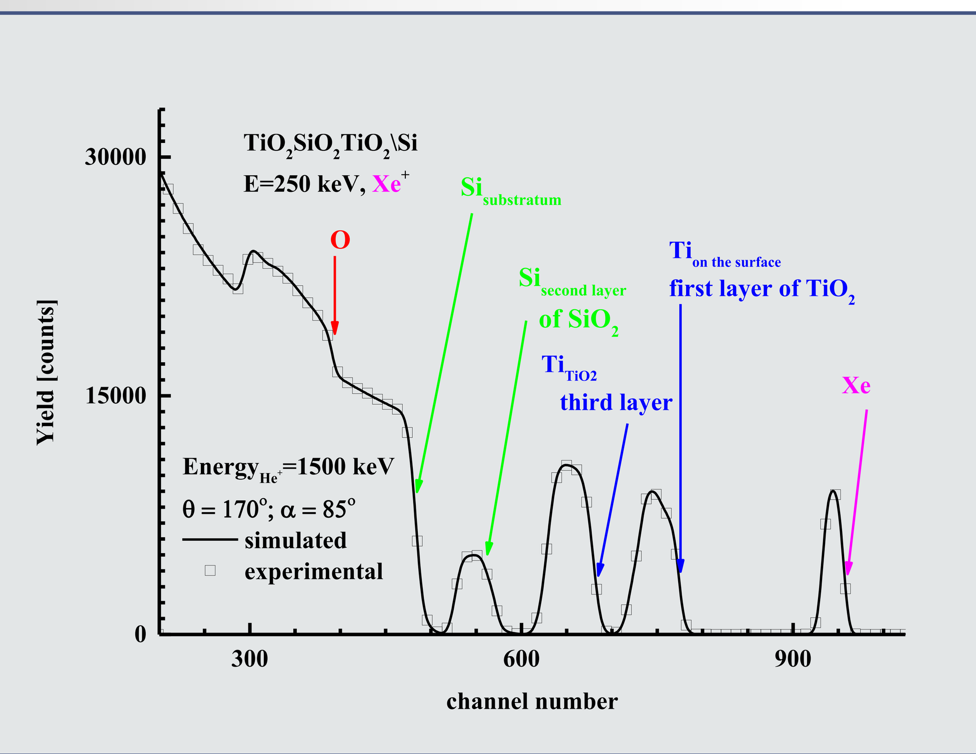
Before ion impl.

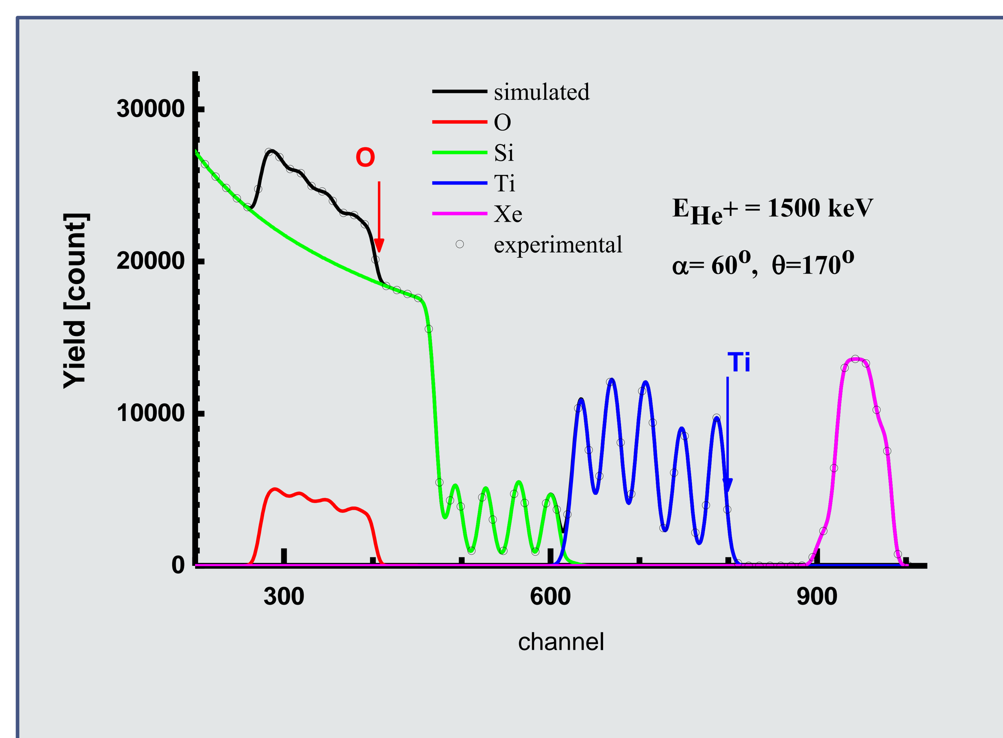


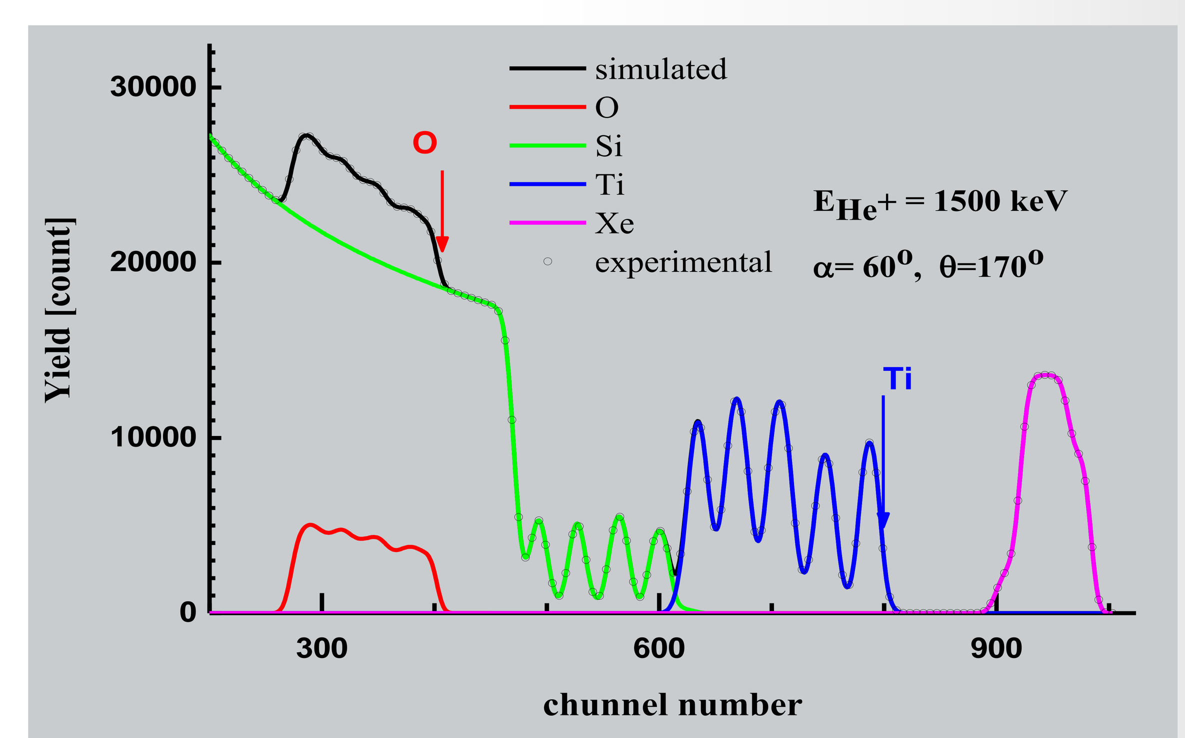
Befor Ion Impl.			
thickness layer [1x10^{15} atom/cm^2]	Si	O	Ti
95	0.33	0.67	0.00
105	0.00	0.33	0.67
114	0.33	0.67	0.00
175	0.00	0.33	0.67
115	0.33	0.67	

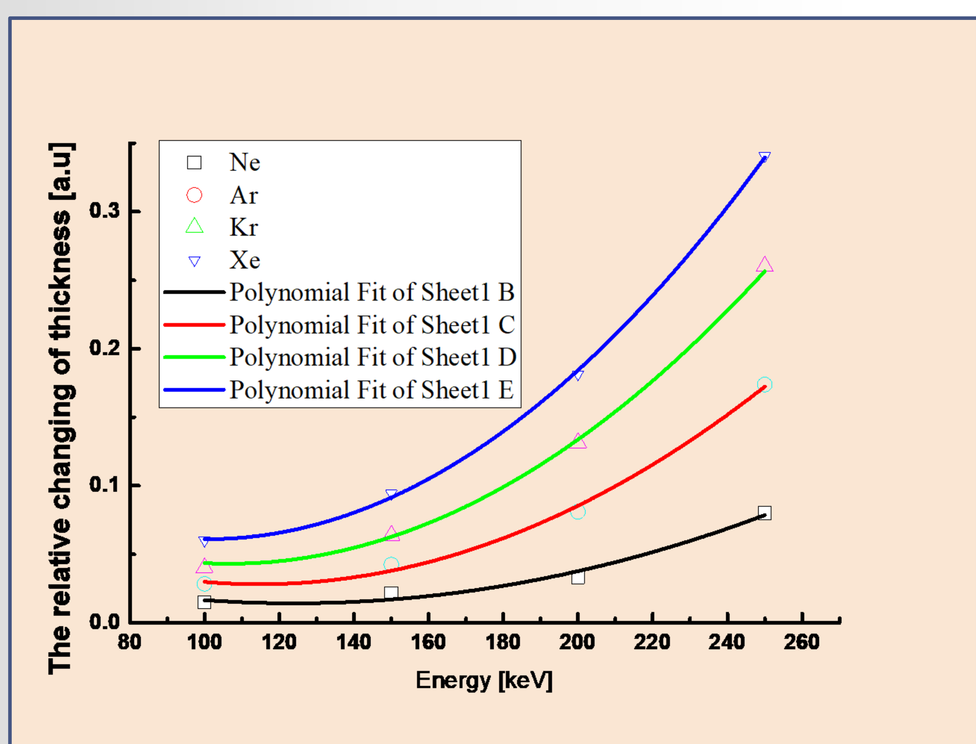


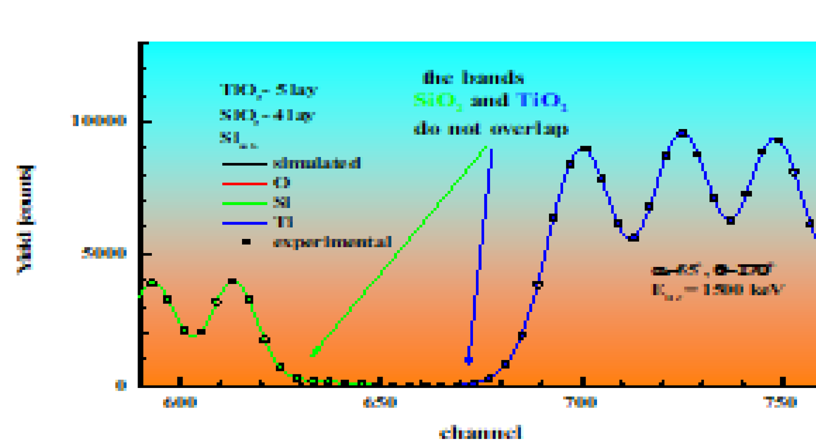
It is noted that at the interface between TiO_2 and Si layers, a transitional layer is formed in the process of ion implication. This is related to the displacement of the Ti and O atoms.

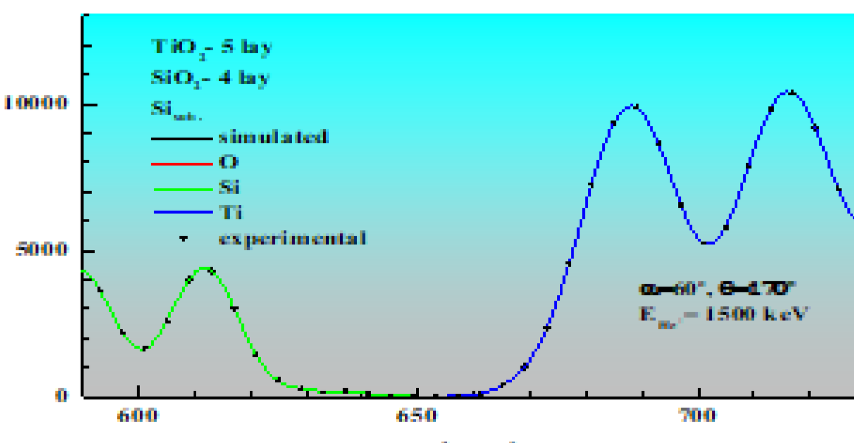


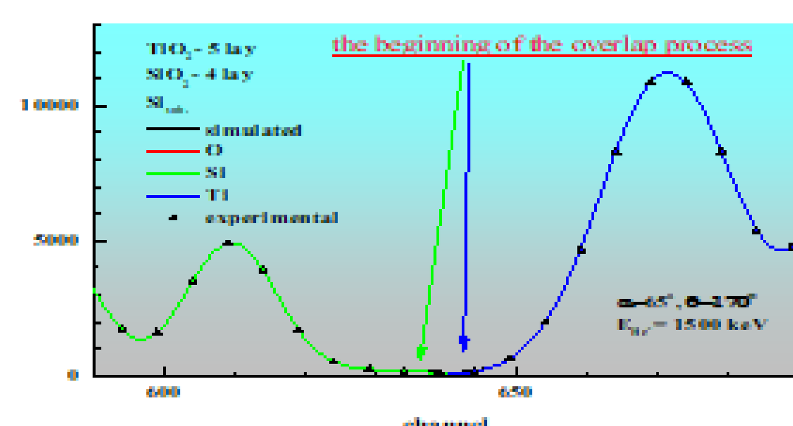


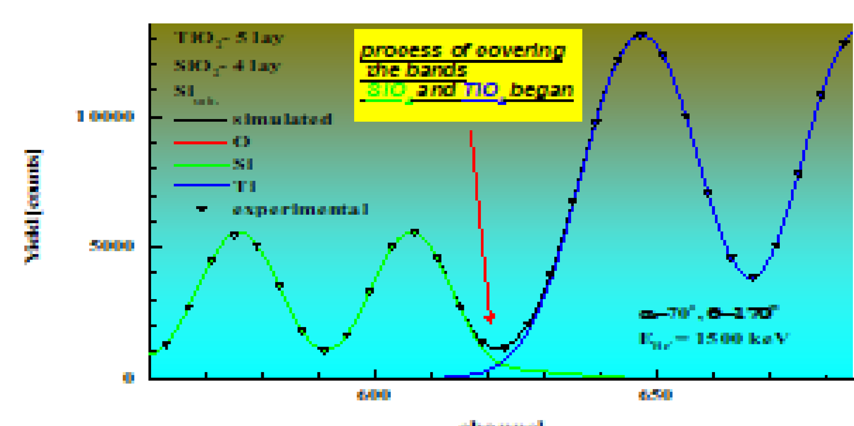




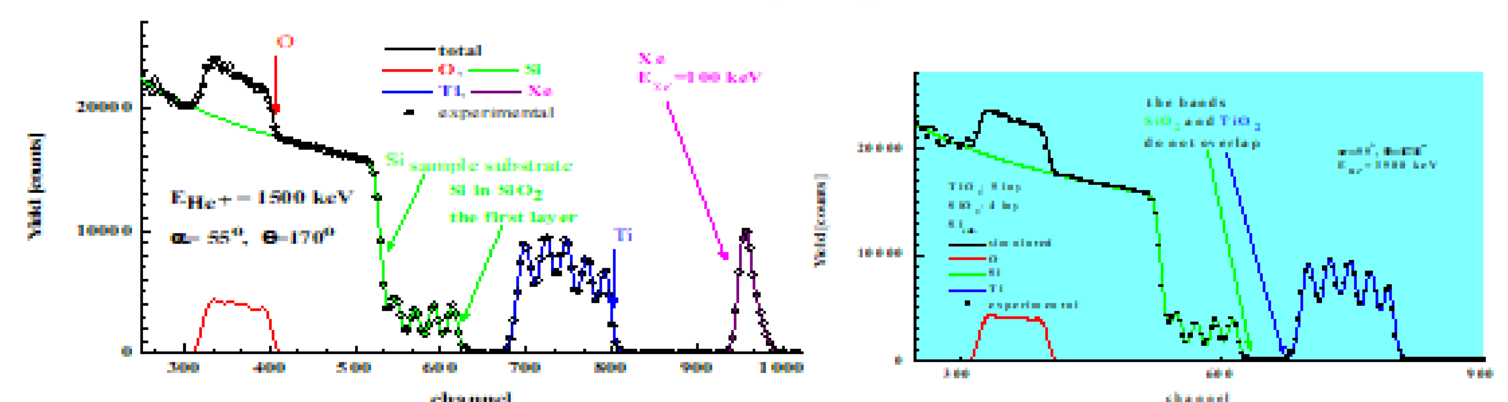


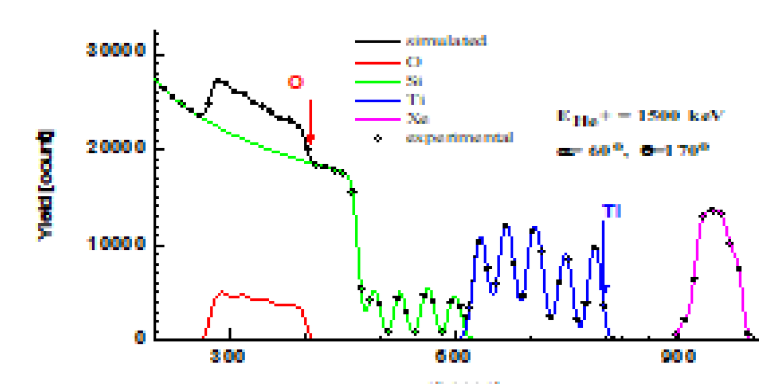






Multilayer systems TiO_2 SiO_2 … Si





first and second "band of scattered α particles " on nuclei of Ti in TiO_2 first, second maximum - after implantation