Tomsk Polytechnic University

DEVICE FOR X-RAY SPECTRAL ABSORPTION ANALYSIS WITH USE OF ACOUSTIC MONOCHROMATOR

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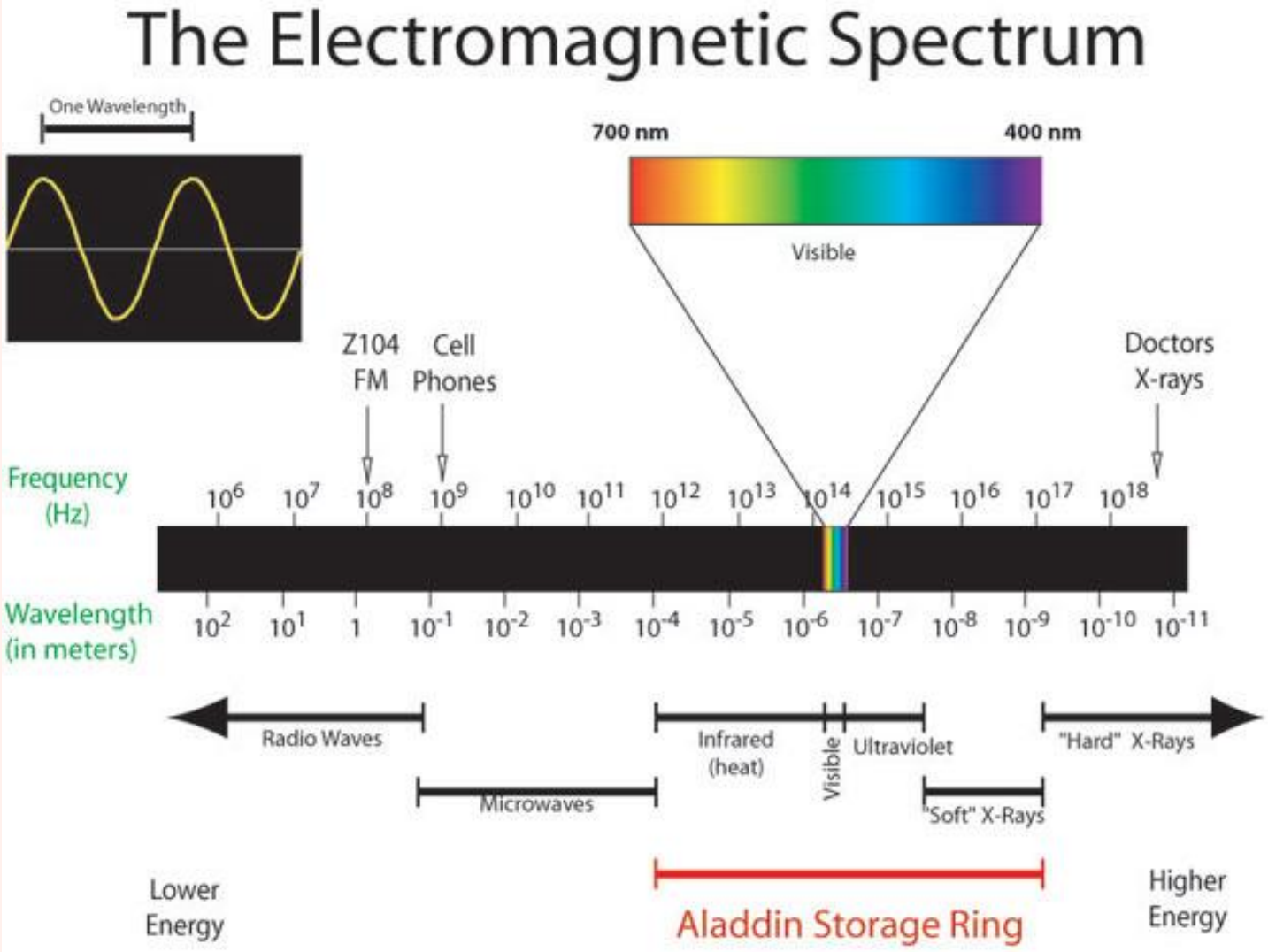
Group OF-121

- X-RAY
- WAVE DISPERSIVE SCHEME

X-RAY



$\lambda = 10^{-12} - 10^{-7}$

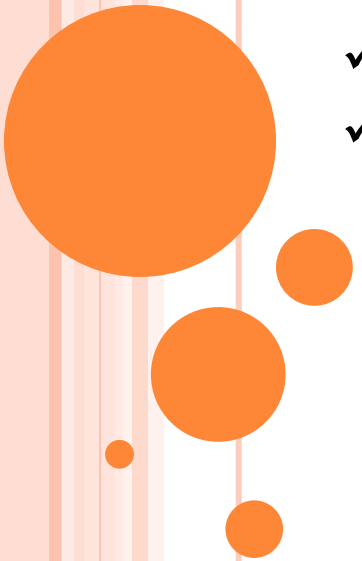
or

$\nu = 10^{15} - 10^{19}$

Problems

- ✓Low sensitivity for ultrapure elemental analysis
- ✓Impossibility to reach required level of sensitivity (more than 10^-4) by use of XRF analysis

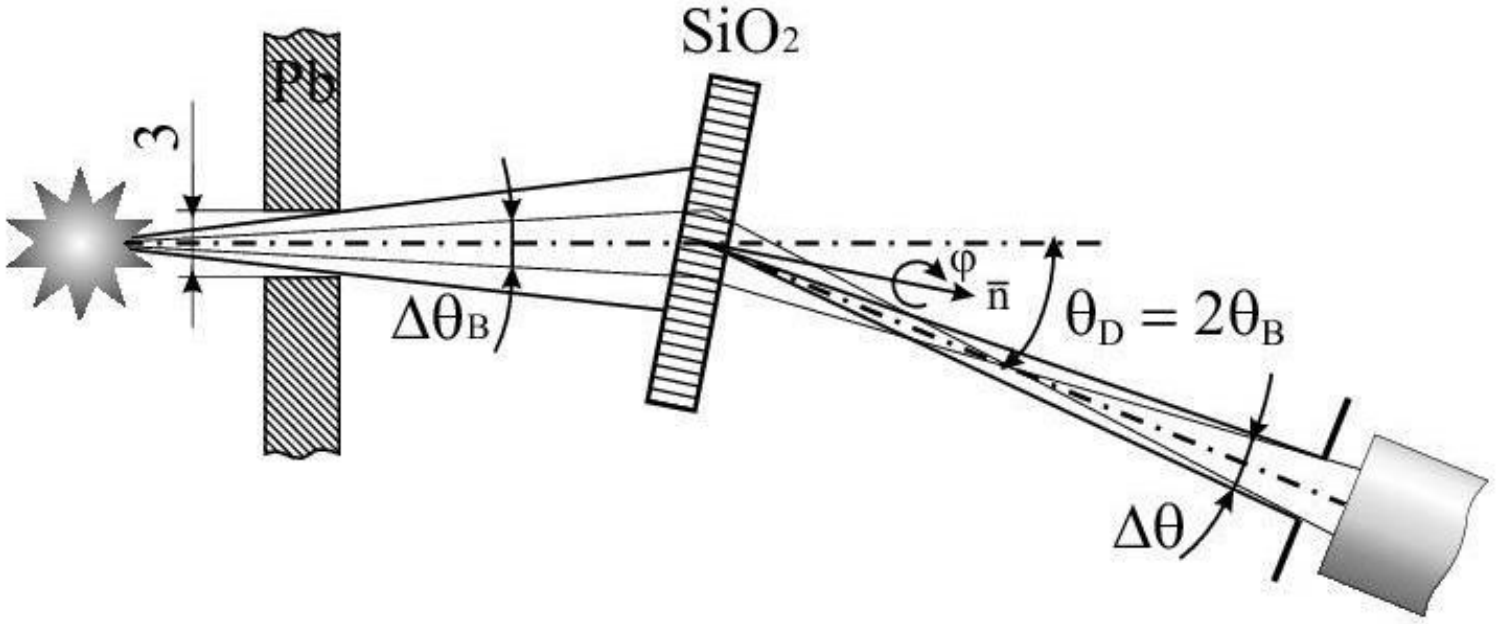
Solutions



- ✓Use approaches of absorption spectroscopy
- ✓Use monochromatic X-ray (wave dispersive method)

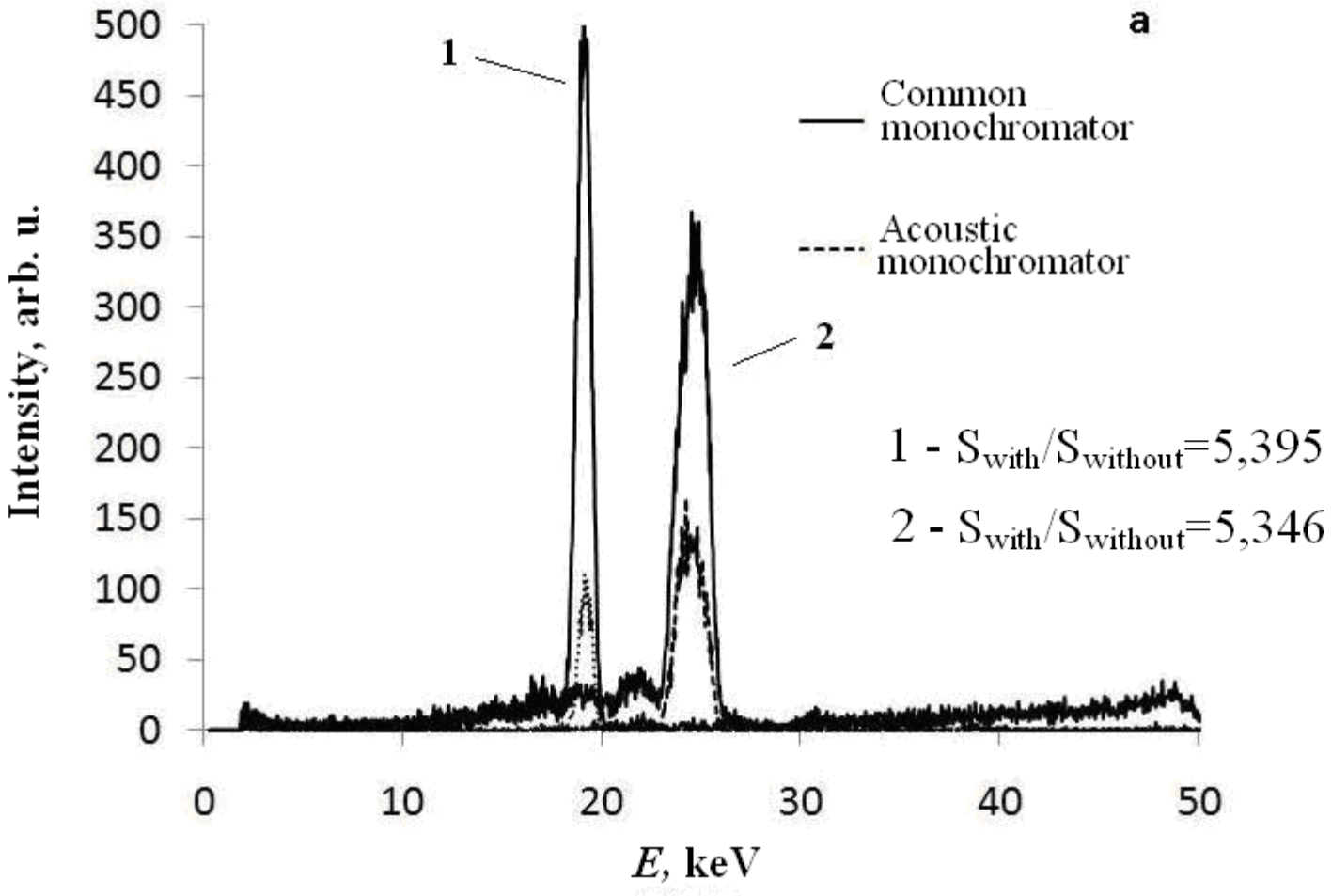
WAVE DISPERSIVE SCHEME

EXPERIMENT SCHEME

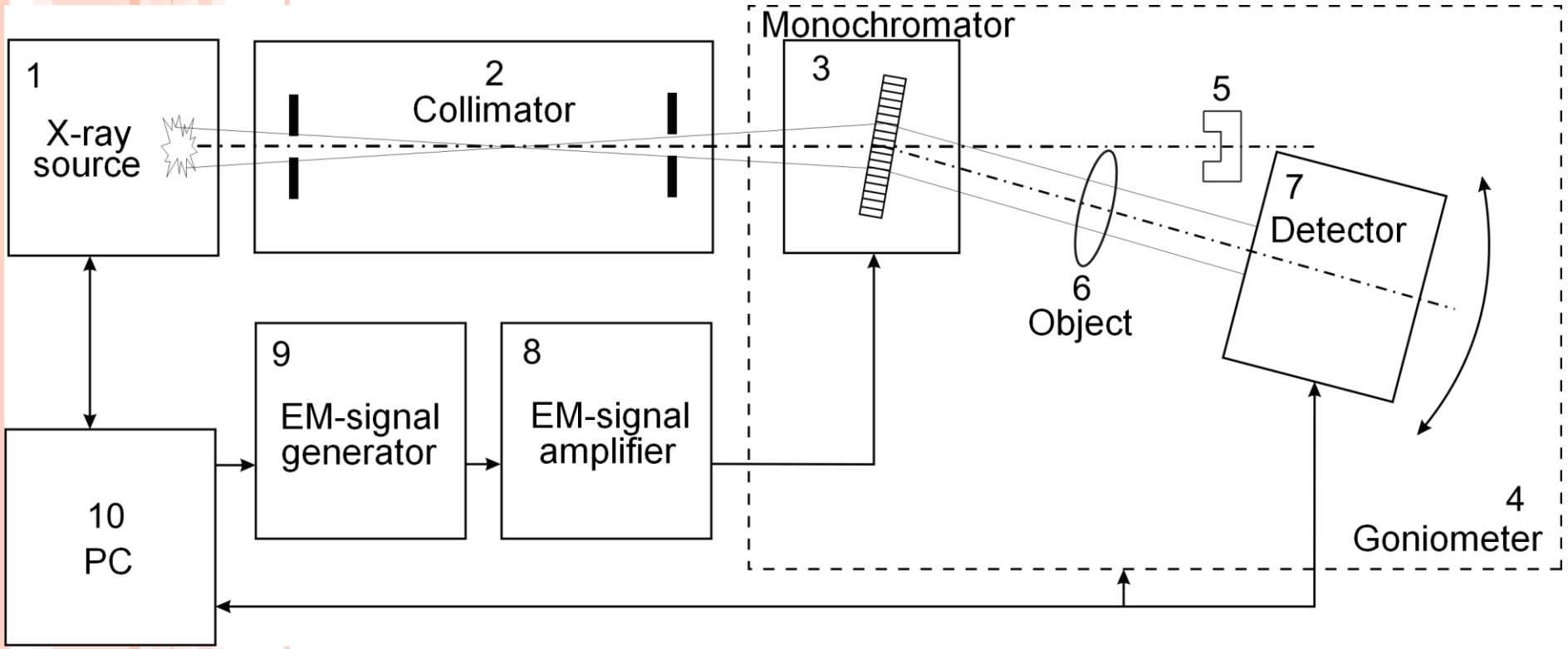


Source-collimator distance	90 mm
Diameter of the collimator	3 mm
Collimator-crystal distance	215 mm
Thickness of crystals	0,3; 0,65; 0,9 mm

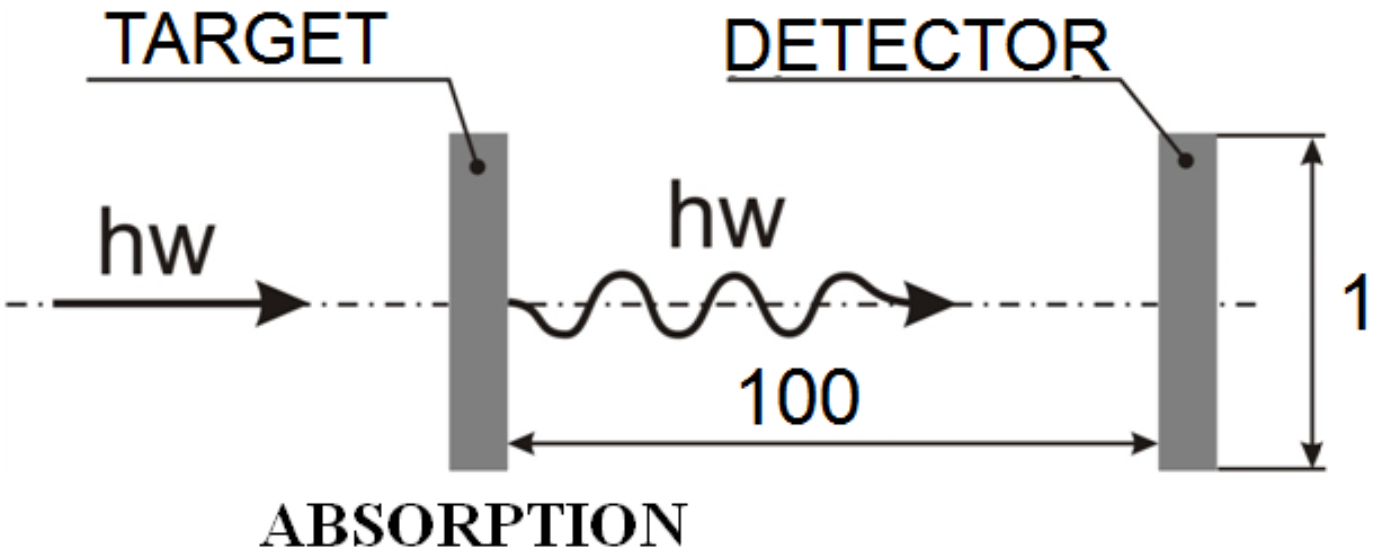
Diffracted X-ray spectra from quartz crystal with thickness equal 0,3 mm. Bragg's angle is 5,5°(1) and 4,4°(2)



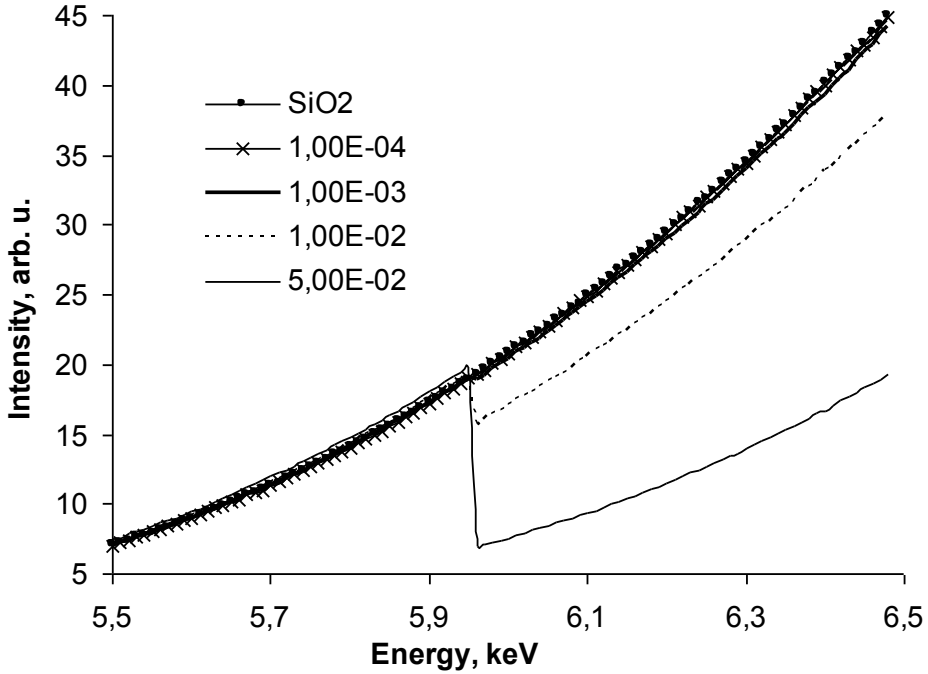
DEVICE SCHEME

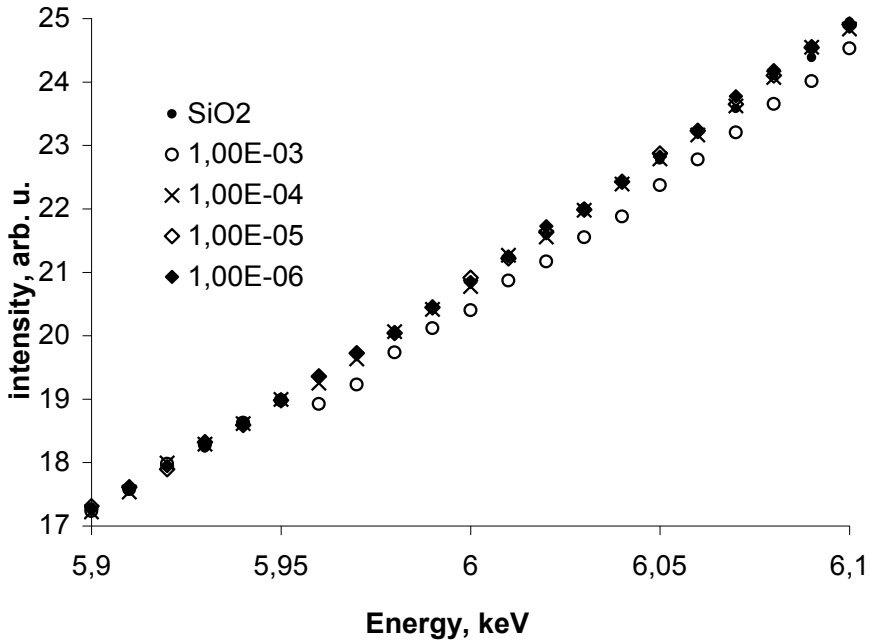


SIMULATED EXPERIMENT SCHEME



X-RAY SPECTRA IN CASES WITH OPTIMAL THICKNESSES TARGETS FOR DIFFERENT MATERIALS





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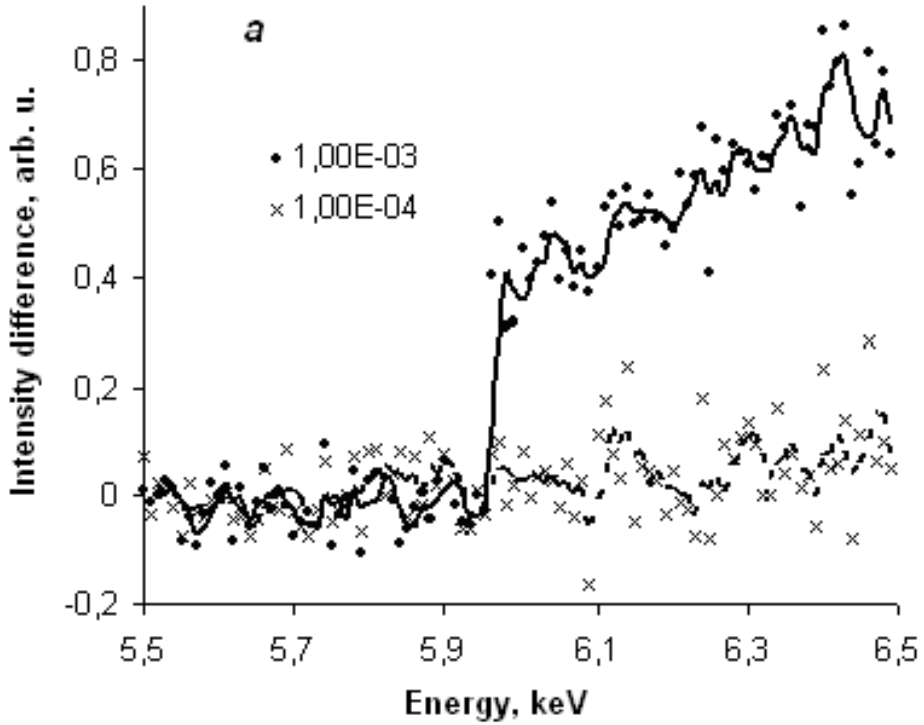

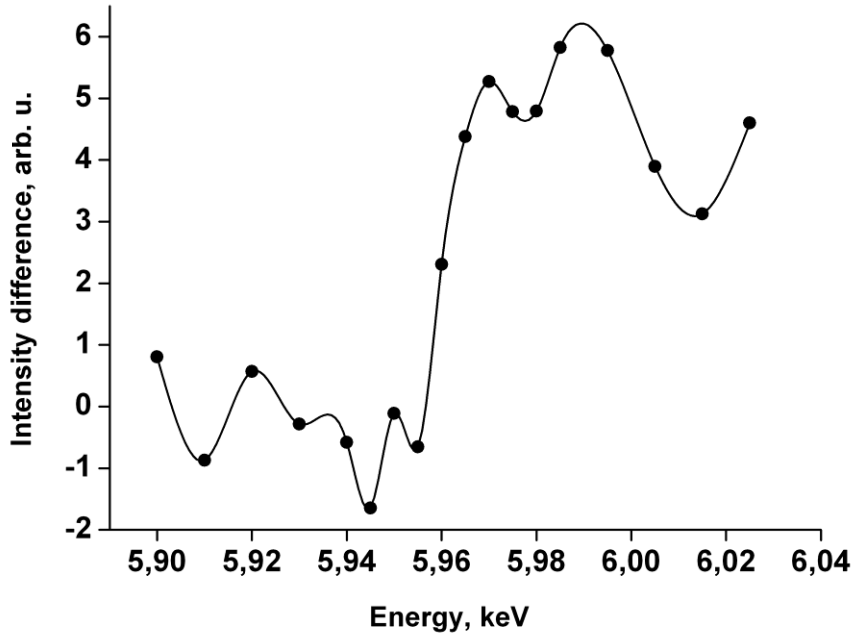

CONCLUSIONS

THANK YOU FOR YOUR ATTENTION!

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