## Scope and Sensitivity of Analysis of the New ToF-ERDA Installation

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Abstract. Materials and technology research cannot be done without knowledge of the elemental composition of investigated materials. One of the effective ways for determining the depth concentration profile of individual elements or isotopes in thin surface layers is the use of ion beam analysis methods. Recently, the Trnava STU laboratory of the 6 MV tandem ion accelerator was equipped with a Time-of-Flight Elastic Recoil Detection Analysis (ToF-ERDA) measurement system and became one of the not many analytical facilities in the world that regularly use this method. The verified scope and sensitivity of the analysis, which are physically determined, also depend on the quality of the realization of the ToF-ERDA setup and on the range of the available analyzing ion beams, in terms of the mass and energy of the ions used. The ToF-ERDA setup was developed and installed by the University of Jyväskylä. The achieved measurement range was determined from the review of ToF-ERDA analyzes carried out during the first year of using the ToF-ERDA system. The results of the ToF-ERDA analysis are presented, which document the achieved: a) depth resolution of the analysis on the surface better than 10 nm and 45 nm at a depth of 450 nm, b) the depth of analysis usually up to 500 nm, for samples with a lower density even up to 1000 nm, c) all elements can be detected from hydrogen to lead, d) sensitivity of the analysis for the entire range of elements 0.02 at.%. Apart from heavy elements, it is also possible to determine the isotopic composition within the limits of the above sensitivity. A typical measurement time is from 30 to 60 minutes, while several dozen elements or isotopes can be identified within single measurement. This is presented through several examples of the resulting Time of Flight vs. Energy histograms and depth concentration profiles.

## ACKNOWLEDGMENTS

This work was co-funded by the VEGA 1/0558/24 project. We thank our colleague Eva Cuninková, who provided samples of etched high-temperature superconducting tapes.