

## Improving material properties and performance of nuclear targets for transmutation-relevant experiments

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TRAKULA is a joint research project of the German Federal Ministry of Science and Education (BMBF) whose main focus is on obtaining high-quality nuclear data relevant to the transmutation of radioactive waste [1]. Fission cross section measurements on actinides, carried out as a part of the TRAKULA project, require well characterized and very homogeneous large-area actinide targets.

Molecular plating is one of the most successfully applied techniques for the production of targets to be used in nuclear science experiments [2]. The element of interest is electrodeposited from an organic medium and layers of acceptable uniformity are quickly produced with quantitative yields. Yet MP-produced targets are usually defective, characterized by surface cracks, and sometimes with poor structural rigidity. Such properties negatively affect the experiments to be performed, especially the irradiation ones. In order to produce optimum targets for TRAKULA, in the last years we have undertaken efforts to improve the quality of the obtained layers. Extensive investigations of the MP process have been carried out to elucidate the basic features of this electrochemical technique [3]. Constant current density electrolysis experiments have been performed in organic media using lanthanides as model elements for the tests. Different plating parameters have been studied and the produced layers have been routinely characterized with several analytical techniques. The latest results of these studies will be reported, which allowed identifying those plating parameters that have a crucial influence on the homogeneity, structural rigidity, surface roughness, and morphology of the layers [4,5]. The presentation will also demonstrate that nuclear targets perform differently depending on the properties of the layers [6]. Finally, characterization analyses and preliminary results of the performance of the targets produced for the TRAKULA-related fission experiments will be shown.

### References:

- [1] TRAKULA website ([www.hzdr.de/TRAKULA](http://www.hzdr.de/TRAKULA)).
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