HORIZON 2020

# HORIZON 2020 RESEARCH AND INNOVATION FRAMEWORK PROGRAMME OF THE EUROPEAN ATOMIC ENERGY COMMUNITY

## Nuclear Fission and Radiation Protection 2018 (NFRP-2018-4)

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**Summary**

In total, WP3 received 20 target requests.

- 12 target requests are finished and the targets are delivered. PSI contributed with 4 and JRC with 8 requests.
- 5 target requests are pending (PSI has 4 requests under discussion and JRC has 1 request pending because the equipment to produce the requested targets is not commissioned yet)
- 2 target requests were cancelled (Isotope production is currently not feasible; Project withdrawn from SANDA) and 1 is on hold (Preparation for further use, no experiment envisaged).

Details about the target requests are shown in

- Appendix 1: List of delivered targets
- Appendix 2: List of pending targets
- Appendix 3: List of cancelled targets

Appendix 1: List of delivered targets

| | | SANDA Domain other | Target User | | | Target production | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | | Spokeslab. | Facility | Target request | Request sent to | Target producer | Status of target preparation | Delivery |
| | **Ta-179** | non-energy application | Ruchi Garg et al. University of Edinburgh, UK ruchi.garg@ed.ac.uk | TRIGA reactor Mainz | Separation of Ta-179 from irradiated Hf | PSI | PSI | Finished | First target delivered, experiment performed; preparatory studies for target with higher activity under discussion |
| | **Se-79** | energy and non-energy application | V. Babiano Instituto de Física Corpuscular (IFIC), Spain vbabiano@ific.uv.es | CERN n_TOF | PbSe on a support foil Isolating Se from PbSe | PSI | PSI | Finished | Preparatory studies for isolating Se from Pb done. For the already irradiated target not feasible. The target is provided as PbSe on a support foil |
| | **Nb-94** | non-energy application | V. Babiano Instituto de Física Corpuscular (IFIC), Spain vbabiano@ific.uv.es | CERN n_TOF | Elemental Nb; target in spiral shape | PSI | PSI | Finished | Target delivered, experiment performed |
| | **Be-10** | non-energy application | M. Petri University of York | NL Argonne | Thin target ~160ug/cm2 | PSI | PSI | Finished | Target delivered, first experiment performed; Targets with higher activity in discussion |
| | **Pu-239** | SANDA 2.2.1 | Daniel Cano-Ott et al. CIEMAT, Spain daniel.cano@ciemat.es | CERN n_TOF | 10x 239Pu deposits 320-330µg/cm2 + 1x 239Pu 100 µg/cm2 Ø20mm on 20 µm thick Al | JRC-Geel | JRC-Geel | Finished | Targets delivered in ionisation chamber at GELINA in May 2022 and delivered at CERN in September 2022 |
| | **Pu-239** | SANDA 2.2.1 | Daniel Cano-Ott et al. CIEMAT, Spain daniel.cano@ciemat.es | CERN n_TOF | 100mg 239Pu powder in Al container with Ø10 mm | JRC-Geel | JRC-Geel | Finished | Target delivered in September 2022 |

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| | **U-238** | SANDA 1.2.3 | Gilbert Bélier et al. CEA/DAM-DIF gilbert.belier@cea.fr | NFS France | 3x 238U deposits (total 10 mg 238U) Ø30mm on aluminized 70-80 µg/cm2 PI foil | JRC-Geel | JRC-Geel CEA | Finished | Targets delivered in June 2021 |
| | **U-238** | SANDA 1.2.3 | Gilbert Bélier et al. CEA/DAM-DIF gilbert.belier@cea.fr | NFS France | 2x 40 µg/cm2 PI foil on test frames (one golded, and one silvered frame received from CEA). | JRC-Geel | JRC-Geel | Finished | Foils delivered in June 2021 |
| | **U-238** | SANDA 1.2.3 | Gilbert Bélier et al. CEA/DAM-DIF gilbert.belier@cea.fr | NFS France | 5x 70-80µg/cm2 PI foil on special 1mm thick Al-ring Øout 60mm Øin 40mm | JRC-Geel | JRC-Geel | Finished | Foils delivered in Oct 2021 |
| | **U-235** | | Alexander Prokofiev et al. Uppsala, Sweden alexander.prokofiev@physics.uu.se | NFS France | 2x 30-50 µg/cm2 polyimide foils on 1mm thick Al-ring Øout 90mm Øin 70mm | CHANDA/ WP3 SANDA/WP3 | JRC-Geel | Finished | Foils delivered in Jan 2022 |
| | **U-238** | | Alexander Prokofiev et al. Uppsala, Sweden alexander.prokofiev@physics.uu.se | NFS France | 3x 238U deposits 400 µg/cm2 Ø25mm on 40 µg/cm2 PI foil | CHANDA/ WP3 SANDA/WP3 | JRC-Geel | Finished | Targets delivered in June 2021 |
| | **Pu-239** | SANDA T2.3 | Maëlle Kerveno et al. CNRS IPHC France maelle.kerveno@iphc.cnrs.fr | GELINA JRC-Geel | 2g 239Pu powder in Al container with Ø 50 mm and thickness of 0.5 mm | JRC-Geel | JRC-Geel | Finished | Target delivered in April 2022 |

Appendix 2: List of pending targets

| | SANDA Domain other | Target User | | | Target production | | | |
|---|---|---|---|---|---|---|---|---|
| | | **Spokeslab.** | **Facility** | **Target request** | **Request sent to** | **Target producer** | **Status of target preparation** | **Delivery** |
| **Ta-179** | Non-energy application | Ruchi Garg et al. University of Edinburgh, UK ruchi.garg@ed.ac.uk | TRIGA reactor Mainz | Separation of Ta-179 from irradiated Hf | PSI | PSI | Under discussion | First target delivered, experiment performed; **preparatory studies for target with higher activity under discussion** |
| **Be-10** | Non-energy application | M. Petri University of York | NL Argonne | Thin target ~160ug/cm2 | PSI | PSI | Under discussion | Target delivered, first experiment performed; **Targets with higher activity under discussion** |
| **Ho-163** | Non-energy application | C. Guerrero Univ. Sevilla & CNA, Spain cguerrero4@us.es | CERN n_TOF | $^{163}$Ho target of at least 5 mg | PSI | PSI | Under discussion | Not very realistic |
| **Cr-50/ Cr-53** | Energy-application /structure material | C. Guerrero Univ. Sevilla & CNA, Spain cguerrero4@us.es | CERN n_TOF | Thin and thick targets (up to 80 mg/cm2) | PSI | PSI | Under discussion | Experiment scheduled for 2022; target form to be defined |
| **U-235** | | Alexander Prokofiev et al. Uppsala, Sweden alexander.prokofiev@physics.uu.se | NFS France | 3x 235U deposits 400 µg/cm2 Ø25mm on 40 µg/cm2 Pl foil | CHANDA/ WP3 SANDA/WP3 | JRC-Geel | Delay on commissioning of new U235 evaporator | 2024 |

Appendix 3: List of on hold/cancelled targets

| | | SANDA Domain other | Target User | | | Target production | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | | Spokeslab. | Facility | Target request | Request sent to | Target producer | Status of target preparation | Delivery |
| | **Pb-205** | Non-energy application | Adrià Casanovas Universitat Politècnica de Catalunya (UPC) adria.casanova@upc.edu | CERN n_TOF | Production of sufficient amount; manufacturing of a suitable target | PSI | PSI | cancelled | Isotope production currently not feasible |
| | **Sr-87** | Non-energy related | F. Gunsing CEA Saclay | CERN n_TOF | Recovery of partially oxidized sample | PSI | PSI | on hold | Preparation for further use, no experiment envisaged |
| | **Pu-242** | | Beatriz Jurado et al. CENBG, France jurado@cenbg.in2p3.fr | IPNO France | 242Pu on 100 µg/cm² thick C-nat foil | SANDA/WP3 | | Project withdrawn from SANDA | NA |