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First generation targets for ISOL@MYRRHA: Al and Mg isotopes production.

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ISOL@MYRRHA will be an ISOL facility featuring, in the phase 1 of the MYRRHA project, a proton beam of energy 100 MeV and currents up to 500 μA. This facility will produce RIBs for several research applications in fundamental interactions, nuclear physics, condensed matter, biology and nuclear medicine.
The first-generation targets of ISOL@MYRRHA are being designed for proton beam currents of up to ~20 μA. This contribution focuses on SiC and Ti targets to produce 23-29Al and 22-28Mg beams for solid-state and fundamental nuclear physics research. Furthermore, the isotopes 44-47 Sc, of relevance for nuclear medicine, can be extracted from Ti targets.

The ongoing target design, based on FLUKA simulations will be presented. In this framework, to evaluate the accuracy of estimated production values, cross sections for proton-induced reactions derived from the FLUKA code have been compared with experimental cross sections in the EXFOR database for natural-Si and natural-Ti targets at proton-beam energies between 26-150 MeV.

Beyond in-target production rates, this contribution will also discuss RIB yields estimates. The methodology for inferring efficiencies from calculations based on the ISOLDE and ISAC yield databases will be discussed along with the findings of this analysis.

Preliminary studies of the physical and chemical properties of sample powders considered for SiC target manufacturing will also be presented. The powder grain size and morphology were evaluated from SEM micrographs, while Al presence was detected through EDS analysis.

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