

Thermal treatments and characterization of pellets for direct SPES target

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The production of targets for the generation of Radioactive Ion Beams (RIB) characterized by high power resistance, fast diffusion release, high permeability and high ionization yield is a topic of great interest and the research on this field is currently very lively [1,2].

In this work, the synthetic route where carburization of a suitable precursor compound of lanthanum is obtained by mixing the compound with a proper amount of graphite and a binder, followed by thermal treatment has been chosen. In order to improve the porosity of the final material a novel technique, which makes use of lanthanum oxalate as starting precursor, has been tested.

Two series of pellets with diameter of 13 mm and thickness of 1 mm were obtained by mixing lanthanum oxide or lanthanum oxalate and graphite in a mortar and the cohesion of the powders was assured by the addition of a phenolic binder.

Thermal treatments on the pellets were performed in a Lindberg furnace, equipped with an alumina tube. In a first run, a thermal treatment has been performed on a pellet based on lanthanum oxide and graphite previously decarbonated and dehydrated in a muffle furnace at 800°C. The sample was thereafter heated in vacuum up to 1500°C. The success of the carburization process was confirmed by the appearance of the pellet after the treatment, as shown in the photograph reported in Figure 1.

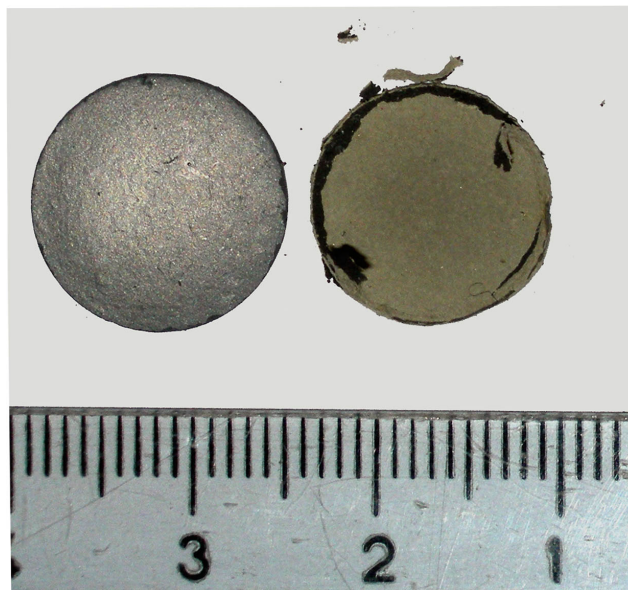


Figure 1: Raw $\text{La}_2\text{O}_3/\text{graphite}$ (left) and $\text{LaC}_2/\text{graphite}$ (right) pellets. The right pellet is partially decomposed due to the exposure to the atmosphere.

[1] G.D. Alton, J.R. Beene, Y. Liu, Nucl. Instr. and Meth. A, 438 (1999) 190.

[2] J.P. Greene, T. Burtseva, J. Neubauer, J.A. Nolen, A.C.C. Villari, I.C. Gomes, Nucl. Instr. and Meth. B, 241 (2005) 986.