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Status report of the sample chemical preparation for ^{10}Be and ^{26}Al at LN2C : Part 2 : Improving the targets quality prior AMS measurements.

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The extractions of beryllium and aluminum samples by ion exchange resins prior AMS, depend heavily on the quality of quartz purity. However, even with meticulous purification, objectives to guarantee sufficient AMS current are not always achieved.

Using a well-known natural sample that had already been studied and purified, quantitative multi-elements (B, Be, Al, Ti, Ca, Na, K, Mg, Fe) monitoring by ICP-OES was carried out. Aliquots were collected in the various eluted fractions (Boron fraction, Beryllium and Aluminum fractions) as well as in the precipitates and supernatants from intermediate purification stages, before and after each column step. The composition of the final Be fraction was then characterized. Using the routine protocol, elements such as Ti, Al and other minor elements were still present. Test targets have thus been prepared to observe the potential influence of these elements on the quality of the AMS measurement and the interest to update the protocol to eliminate the unwanted interferences.

Prior to AMS measurement BeO is mixed with niobium powder in a 1:1 ratio, homogenized then pressed into copper cathode. To avoid problem in the mixing process, we explore the possibility to add a solution of Nb (or Fe) with Be precipitate before the oxidation stage. After oxidation, the sample will be taken straight out of the crucible and added to the cathode. This has already been investigated ([1], [2]), it allows better homogenization of the Nb/sample mixture with a precisely controlled amount of Nb and will reduce target preparation time.

Ref:

- [1] A-M Berggren, G. Possnert, A. Aldahan, Enhanced beam currents with co-precipitated niobium as a matrix for AMS measurements of ^{10}Be . Nuclear Instruments and Methods in Physics Research Section B: Beam Interactions with Materials and Atoms, Volume 268, Issues 7–8, 2010, Pages 795-798. doi.org/10.1016/j.nimb.2009.10.033.
- [2] A. Walker, A. J. Hidy, S. R. Zimmerman, S. J. Tumey, T. Brown, S. M. Braumann, R. Schwartz, J. M. Schaefer. Less is more: optimizing ^9Be carrier addition for AMS analysis of ^{10}Be at CAMS. 15th International Conference on Accelerator Mass Spectrometry. Program and abstracts 2021

Student Submission

No

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