



# Science Week

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## Beryllium-7 at DREsden Accelerator Mass Spectrometry

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Half-lives of routine accelerator mass spectrometry (AMS) nuclides typically range from thousands to millions of years.

We measured short-lived  ${}^7\text{Be}$  ( $T_{1/2} = 53.2$  d) at the DREsden AMS-facility (DREAMS) [1] as low as 90 mBq, which can be challenging for rapid  $\gamma$ -counting.

Simultaneous determination of  ${}^7\text{Be}$  and  ${}^{10}\text{Be}$  ( $T_{1/2} = 1.387$  Ma) via AMS is advantageous for improved understanding of production, transport, and deposition of atmospherically produced  ${}^{7,9,10}\text{Be}$  [2].

Data was normalized to a  ${}^7\text{Be}$  sample produced via  ${}^7\text{Li}(p,n){}^7\text{Be}$ , measured by  $\gamma$ -counting and chemically processed to BeO after adding low-level  ${}^9\text{Be}$  carrier ( ${}^7\text{Be}/{}^9\text{Be} \approx 10^{-12}$ ).

The isobar  ${}^7\text{Li}$  is completely eliminated by chemistry and the degrader foil technique (at detector  ${}^7\text{Be}^{4+}$ , 10.2 MeV, no  ${}^7\text{Li}^{4+}$  possible).

The blank ratio of  $5 \times 10^{-16}$   ${}^7\text{Be}/{}^9\text{Be}$  (0.8 mBq) and simple and fast chemistry allows for the measurement of rainwater samples, collected in Germany, as small as 10 mL corresponding to a few times  $10^{-14}$   ${}^7\text{Be}/{}^9\text{Be}$  [3,4].

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[1] G. Rugel et al., *NIMB* 370 (2016) 94. [2] A.M. Smith et al., *NIMB* 294 (2013) 59. [3] R. Querfeld et al., *JRNC* 314 (2017) 521. [4] C. Tiessen et al. *JRNC* (to be submitted).

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