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Reveal atmospheric phenomena using cosmogenic ^{10}Be and ^7Be base on AMS analysis

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The $^{10}\text{Be}/^7\text{Be}$ ratio is a sensitive tracer for the study of atmospheric transport, particularly with regard to stratosphere-troposphere exchange. Measurements with high accuracy and efficiency are crucial to ^7Be and ^{10}Be tracer studies. Full stripping method of ^7Be have been carried out by few larger AMS. However, for low energy AMS that is difficult to obtain efficient full stripping Be, the method of ^7Be measurement using non-fully stripping is a blank field, which is more widely applicable for all AMS. Firstly, the preparation procedures of rain samples that is suitable for ^7Be and ^{10}Be by AMS measurement at same target have been established. ^7Be analysis has been performed to by full stripping method, which completely removed ^7Li due to its electronic structure, using more homogeneous Si_3N_4 as a secondary stripping film, and same way for ^{10}Be . $^7\text{Be}/^9\text{Be}$ background was less than 2×10^{-16} . On the other hand, study for non-full stripping method to ^7Be has been analyzed by AMS. The magnitude of suppression for isobaric ^7Li has been discussed at each stage, and another interference ^{14}N were found and analyzed. Due to the full stripping method was not used, it makes for it possible to analyze ^7Be with lower energy AMS, which is ultra-low efficiency to obtain $^7\text{Be}^4+$. The non-fully stripping method is generally method for ^7Be analysis especially for low energy AMS. In addition, we discussed quality control and data calibration methods. A preliminary study of environment applied was carried out using ^7Be and ^{10}Be by 3MV AMS. The ratio of $^{10}\text{Be}/^7\text{Be}$ and concentration of ^{10}Be and ^7Be of rainwater collected in Xi'an have been obtained.

Student Submission

No

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