

Measurements of in-situ produced ^{14}C in terrestrial rocks

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We are establishing a reliable measurement system for ^{14}C extraction from quartz at the Lawrence Livermore National Laboratory. We present preliminary results of our experiment.

Application of in-situ produced ^{14}C in the quartz will provide a better understanding of surface processes of the earth. Despite the widely recognized potential of this method, it has not been possible to measure the abundance of ^{14}C contrasted with ^{10}Be and ^{26}Al from quartz, a widely utilized lithology for cosmogenic nuclides studies, although the University of Arizona's group has made significant progress recently. We are establishing a reliable measurement system for ^{14}C extraction from quartz at the Lawrence Livermore National Laboratory. We present preliminary results of our experiment. The total background of ^{14}C is typically about $2\text{-}3 \times 10^5$ atoms. Using a resistance furnace, which can be heated to ~ 1700 C, in-situ produced ^{14}C can be extracted completely from each samples. Clean quartz were separated for ^{10}Be and ^{26}Al measurements. We are using these quartz samples taken from Homestake mine (1600 m below the surface) and Transantarctic Mountains to verify the extraction method, and will then obtain the production rate of ^{14}C produced by direct spallation of oxygen in the quartz.

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