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Low-level 10Be measurements with phenakite carrier

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Over the past 30 years, in situ produced 10Be has used to study exposure ages and erosion rates. Since lowering the measurement background allows us to broaden the time-scale of its applications, there are ongoing work to measure low-level 10Be. Among the challenges, preparation of Be carrier solution from deeply-mined mineral is a key to measure samples that contain small amounts of 10Be. This is because 10Be/9Be of commercially available Be carrier solution is generally indistinguishable from those of the samples that are younger than 1000 years or the samples that yield erosion rates faster than ca. 1000 mm/kyr. While many laboratories by necessity have prepared in-house Be carrier from deeply-mined minerals, comprehensive understanding on the treatment of carrier solution is limited (Stone, 1998; Merchel et al., 2008; Merchel et al., 2013). Here we revisit the method of preparing Be carrier solution using mineral collections stored at Geological Survey of Japan. We selected wide variety of beryl and phenakite from the collections as Be-bearing minerals. One of the advantages using these collections is that the minerals are stored with information on the origins that is often scarce for the commercially available minerals. The variety of the origin also enables us to test if the minerals are from enough deep in terms of cosmic-ray exposure. We discuss the efficiency of laboratory procedures and compare the 10Be/9Be values with commercially available Be carrier solutions.