

## Elemental and isotopic abundances of lithium in chondrule constituents in the Allende meteorite

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Elemental and isotopic abundances of lithium in chondrule constituents in the Allende CV3 meteorite were determined using secondary ion mass spectrometry. Olivines and mesostasis dominated by a feldspathic phase are depleted in Li (less than 1 ppm and 0.1-0.6 ppm, respectively). In contrast, low-Ca pyroxenes and mesostasis dominated by a Na-rich phase are enriched in Li (~1-8 ppm and 0.4-3.5 ppm, respectively) and the interchondrule matrix is generally enriched in Li (~2.0 ppm on average). The Li isotopic abundance of olivine ranges from  $\delta^7\text{Li} \sim -32$  to 21. The spatial distributions of elemental and isotopic abundances of Li in olivines within individual chondrules exhibit no systematic pattern. This suggests that the distribution of Li in olivine was not disturbed during aqueous alteration or thermal metamorphism on the Allende meteorite parent body. Although mesostasis is the last crystallizing phase from a chondrule melt and is expected to be enriched in Li, in the Allende meteorite it is generally depleted in Li. We suggest that during aqueous alteration on the CV asteroid, Li in mesostasis was leached out by aqueous fluids. The Li-enriched Na-rich mesostasis was probably produced later by infiltration of Na-rich fluids. It seems likely that aqueous fluids sequestered alkali elements from the Allende-chondrite region in the CV parent asteroid, although significant amounts of Li are preserved in ferrous olivine in the interchondrule matrix.