Abstract

Melt inclusions trapped in early-crystallized minerals can provide otherwise unobtainable information about the parent magmas of their host igneous rocks. However, melt inclusions suffer a variety of post-entrapment modifications, which must be recognized and reversed in order to retrieve the composition of the primary trapped liquid (PTL). In this regard, melt inclusions in igneous meteorites (particularly martian meteorites and ureilites) present difficulties that are not encountered in terrestrial occurrences, and standard techniques for reconstructing their PTLs have not been developed. The goal of the proposed work is to develop a systematic approach to the problem of reconstructing PTLs from melt inclusions, with emphasis on problems specific to martian meteorites. I will focus on obtaining major element compositions from melt inclusions in olivine, pyroxenes and chromite, using in-situ analytical techniques. Inclusions in specific meteorites will be used as test cases, and existing studies of these inclusions will be reevaluated. Results should provide insights into the petrogenesis of the rocks, as well as melt inclusion methodology.