Introduction:

- Extreme conditions during the Giant Impact should have driven off volatile elements from proto-lunar disc.
- The recent quantification of highly volatile elements (\(H_2O, Cl, F, & S\)) shows this not to be the case.
- Elements with higher condensation temperatures (i.e., moderately volatile elements or MVEs) may record early lunar fractionation events.
- MVEs as a suite are difficult to measure: some have low abundances (low-ppb/high-ppt), as well as a lack of reference materials (SRMs).

Issue:

Polyatomic Interferences: e.g., \(^{114}\text{Cd}\)

\[^{98}\text{Mo} + ^{16}\text{O} = ^{114}\text{Cd}\] Oxide Interference

\[^{74}\text{Ge} + ^{40}\text{Ar} = ^{114}\text{Cd}\] Argide Interference

Results:

- Figure 1a-c: Ag, Pb, & Zn respectively show different levels of depletions between High-Ti (circles & squares) and Low-Ti basalts (diamonds & triangles) with respect to Rb based on condensation temperature relationships.
- Figure 1d: While Se is difficult to measure, it shows a similar pattern as Ag, Pb, & Zn.
- Figure 1e: Rb/Ag vs. Zn/Rb illustrates how High-Ti basalts have been affected by a degassing event.
- Figure 1f: The 50% condensation temperature of the MVEs of interest.

- All elements are replicated in the SRMs with a good degree of accuracy with the exception of Se.
- Cd, In, Sb, Ti, and Bi are below current method detection limits in lunar samples.
- Zn, Se, Rb, Ag, and Pb are more abundant, and match previously published values.

Discussion:

- LMO crystallization models predict that the incompatible MVEs should be more enriched in late stage cumulate sourced basalts (High-Ti) than their early counterparts.
- These data show an unexpected depletion of the High-Ti samples from this expected linear trend.
- This a result of degassing due to a crust breaching impact that occurred toward the end of low-Ti basalt source region crystallization.