

Supplementary Table list

Supplementary Table S1. Table with description of MI before and after heating experiments.

5 *Supplementary Table S2.* First worksheet named “*OlivineMI_full_data_corrthisstu*” is a table containing: (1) general information on the samples from each individual MI hosted in olivine was selected (columns B to H), (2) composition of the major elements as single or average raw data (columns I to V), (3) major element compositions normalized to 100% on an anhydrous basis (columns W to AJ), (4) EMP analysis of olivine hosts normalized to 100% (columns AK to AS), (5) SIMS analysis of glass of MI (columns AT to AY), (6) Composition of glass of MI after PEC and Fe-loss correction (columns AZ to BN), (7) general information of MI (columns BO to BQ), (8) volatile concentrations restored (columns BR to BV), and (9) estimated pressures (depths) and fluid composition based on MafiCH (columns BW to BZ). The second spreadsheet named “*EMP raw data*” contains EMP raw data for individual MI (some of which were
10 analyzed more than one time) and individual host..

Supplementary Table S3. The first spreadsheet “*Glass standards SIMS*” represents glass references used for SIMS analysis of the MI of this study. The volatile compositions of the glass references used in this study are compared with those of the literature. The second spreadsheet “*Glass Standards raw analysis*” contains the raw data of the glass references used for this study. Finally, the third spreadsheet “*Melt Inclusion raw analysis*” contains raw data of the glass of MI reported in this study.

15 *Supplementary Table S4.* Prediction of the CO₂ contents of the bubble of MI using the software MIMiC (Rasmussen et al., 2020).

Supplementary Table S5. H₂O-CO₂ restored compositions of MI of this study and the estimated pressures of formation based on MafiCH model (Allison et al. 2022). In addition, in a separate worksheet “*H-diffusive experiments*”, we reported the parameters used to calculate the degree of reequilibration of MI for their H₂O contents during heating experiments. See the text for details about the method used to correct the MI for H-loss during heating experiments.

20 *Supplementary Table S6.* Petrolog3 predictions based on the MI SCL14-D92-3-1 as starting composition. The H₂O was marked as saturated for the calculation.

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