

Fig. S1 Theoretical simulation of ^{153}Eu signal intensity as a function of laser spot size and ablation frequency under the optimized instrumental conditions. The boxes and horizontal bar represent the ^{153}Eu signal intensities range and the average value for three olivine reference materials, respectively. Numbers in the parentheses below the name of the olivine reference materials are average values of measured Eu concentrations.

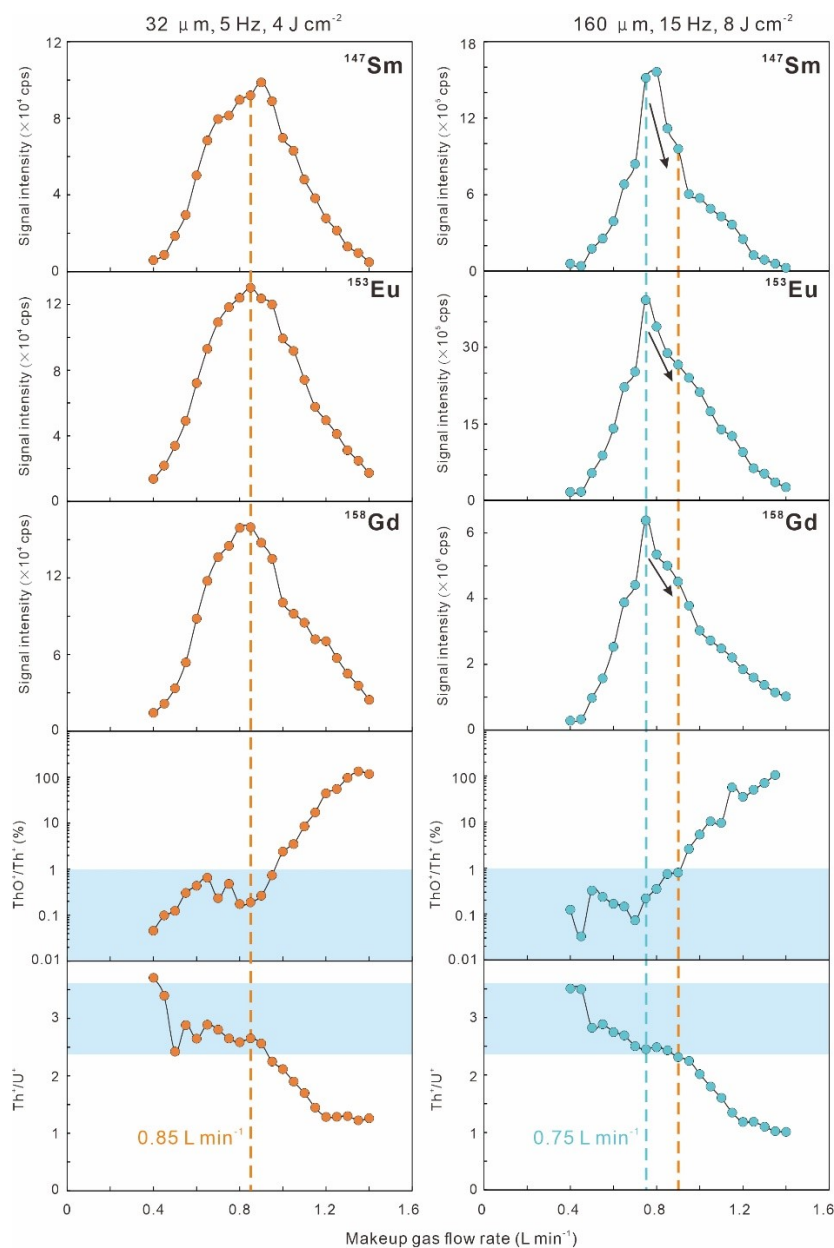


Fig. S2 The integrated average signal intensity of ^{147}Sm , ^{153}Eu , ^{158}Gd , ThO^+/Th^+ ratio, and Th^+/U^+ of BHVO-2G using Jet sample cone + H skimmer cone with the GE in the Ar- N_2 mixed plasma ($2 \text{ ml min}^{-1} \text{ N}_2$). The blue bands encompass the range of ThO^+/Th^+ ratio <1% and Th^+/U^+ ratio of 2.4-3.6, which represent negligible oxide formation and inter-element fractionation. The vertical dashed lines represent the optimum makeup gas flow rate for the three modes investigated while maintaining a Th^+/U^+ ratio of 2.4-3.6 and a ThO^+/Th^+ ratio of <1.0%.