



Electronic Appendix 1: Four examples of calibration curves used in this study. (a) Measured $^{16}O^{1}H^{-}/^{30}Si^{-}$ in olivine standards as a function of their known H_2O content; (b) measured $^{16}O^{1}H^{-}/^{30}Si^{-}$ in glass standards as a function of their known H_2O/SiO_2 ratio; (c) measured $^{19}F^{-}/^{30}Si^{-}$ in glass standards as a function of their known F/SiO_2 ratio; and (d) measured $^{35}Cl^{-}/^{30}Si^{-}$ in glass standards as a function of their known Cl/SiO_2 ratio. In (b), (c) and (d) the corresponding H_2O , F and Cl contents, respectively, are given on top of each graph. All standard data have been corrected for blank. R^2 : regression coefficient for a least-squared regression forced through zero; Slope: slope of the regression line; LOD: limit of detection. The lowest part of each curve is magnified in insets.