Supplementary Materials for

Zircon behavior in the partially melted mantle

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The PDF file includes:

Figs. S1 to S7
Table S1

Other Supplementary Materials for this manuscript include the following:

Data S1-S8

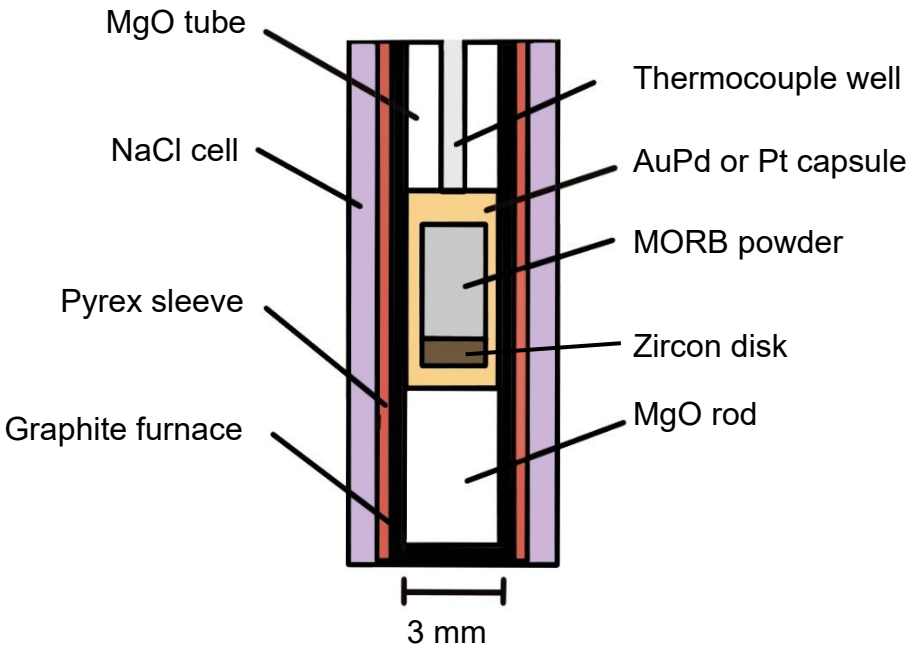

Fig. S1.
Schematic illustration of the experimental set-up showing a capsule with a zircon disk filled with MORB.

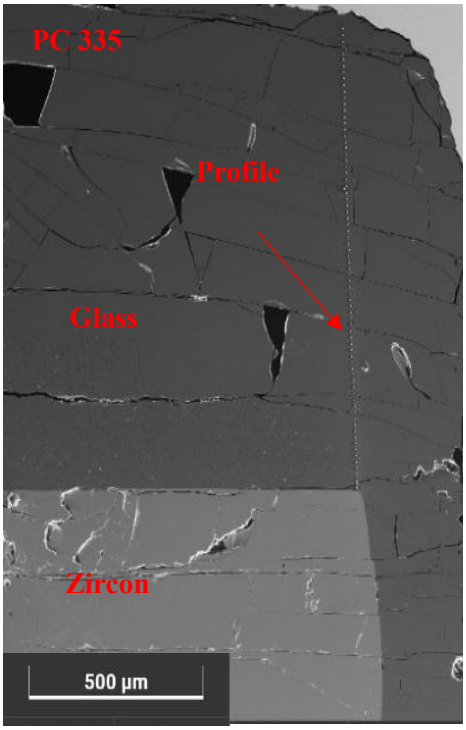

Fig. S2.
Secondary electron image showing the location of compositional profiles obtained with EPMA.

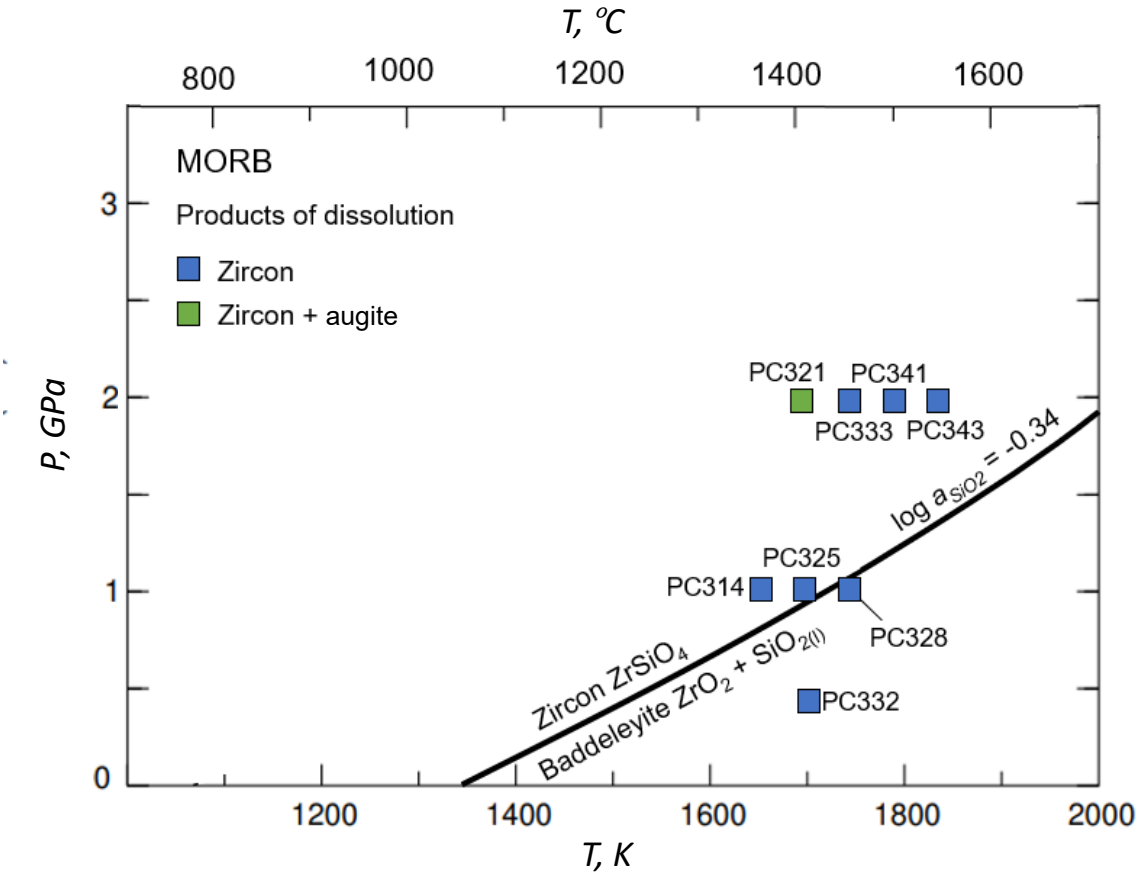

Fig. S3.

P–T conditions of zircon dissolution experiments and the position of Zrn–Bdy reaction. Silica activity of Zrn-Bdy reaction for MORB was calculated using MELTS software, and the P-T position of the line was determined using Perple_X.

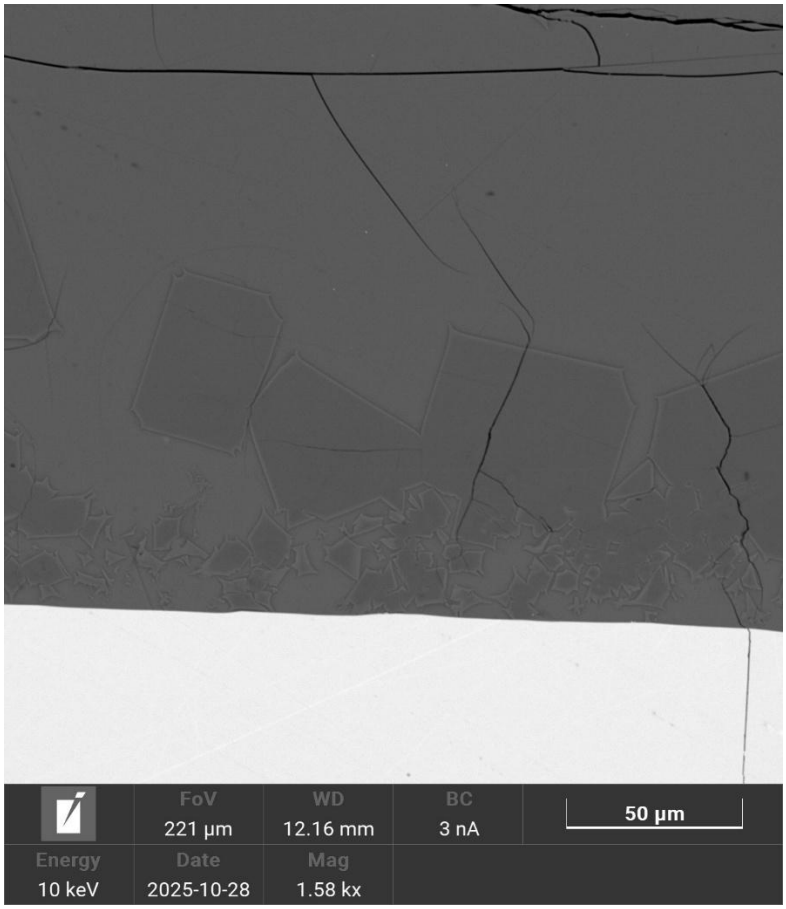

Fig. S4.
BSE image of sample PC321 showing augite crystals along the zircon interface.

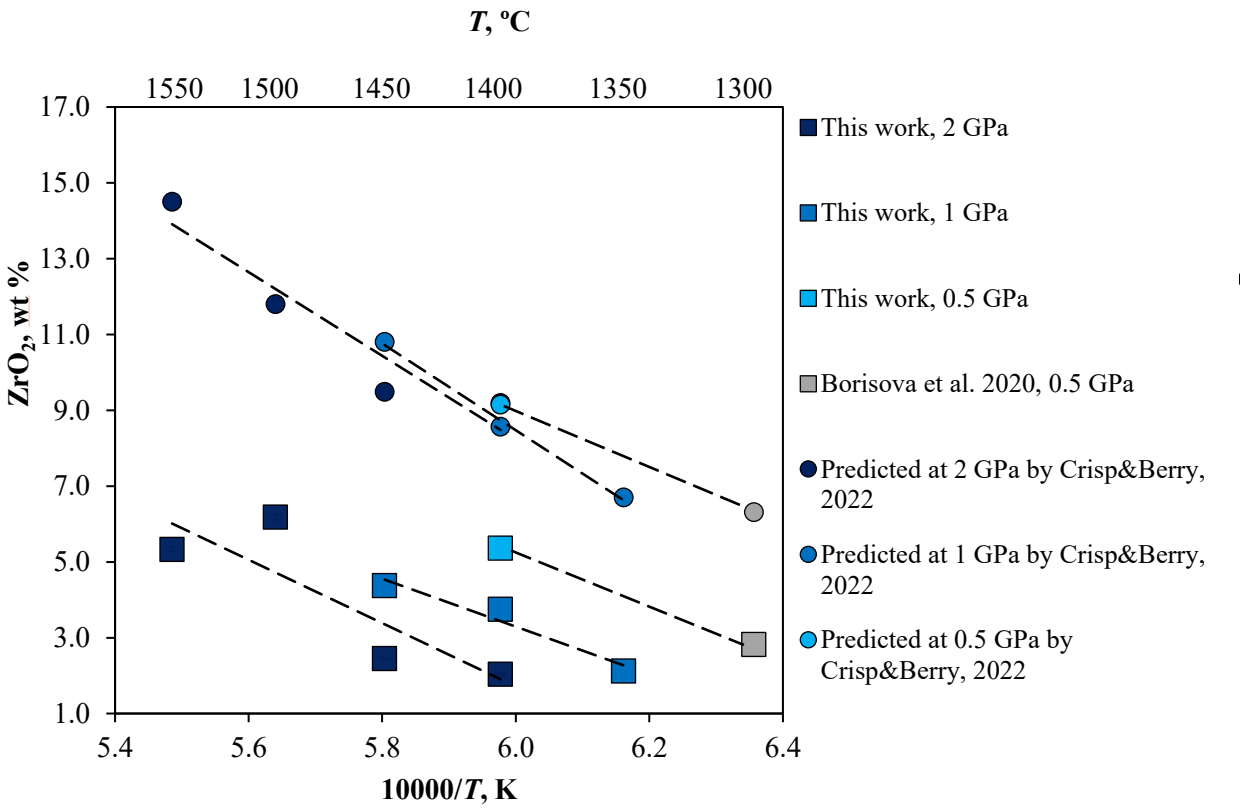

Fig S5.
Zircon saturation obtained in our experiments (squares) and predicted by the model of Crisp and Berry (*12*) as a function of temperature.

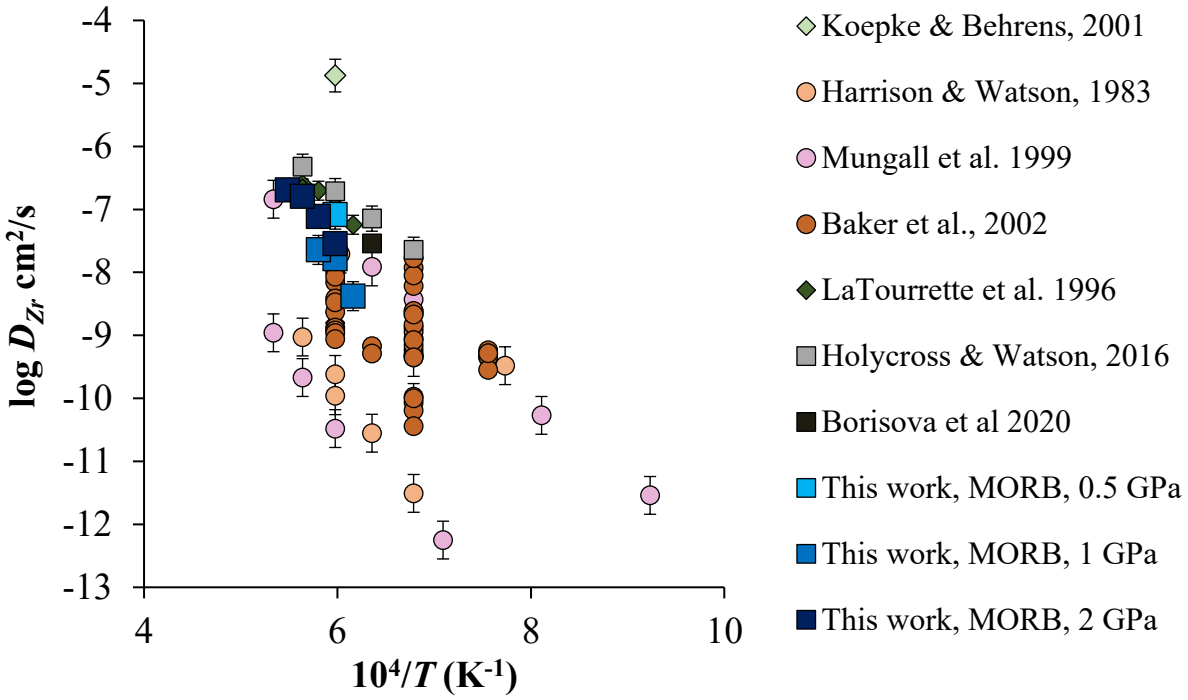

Fig. S6.

Zr diffusion coefficients in melts of different composition versus temperature. Circles – felsic compositions, squares – basalts, green diamonds – synthetic andesitic melt, dark green diamonds – forsterite-diopside-anorthite melt. The new data from this study for MORB is shown in blue squares.

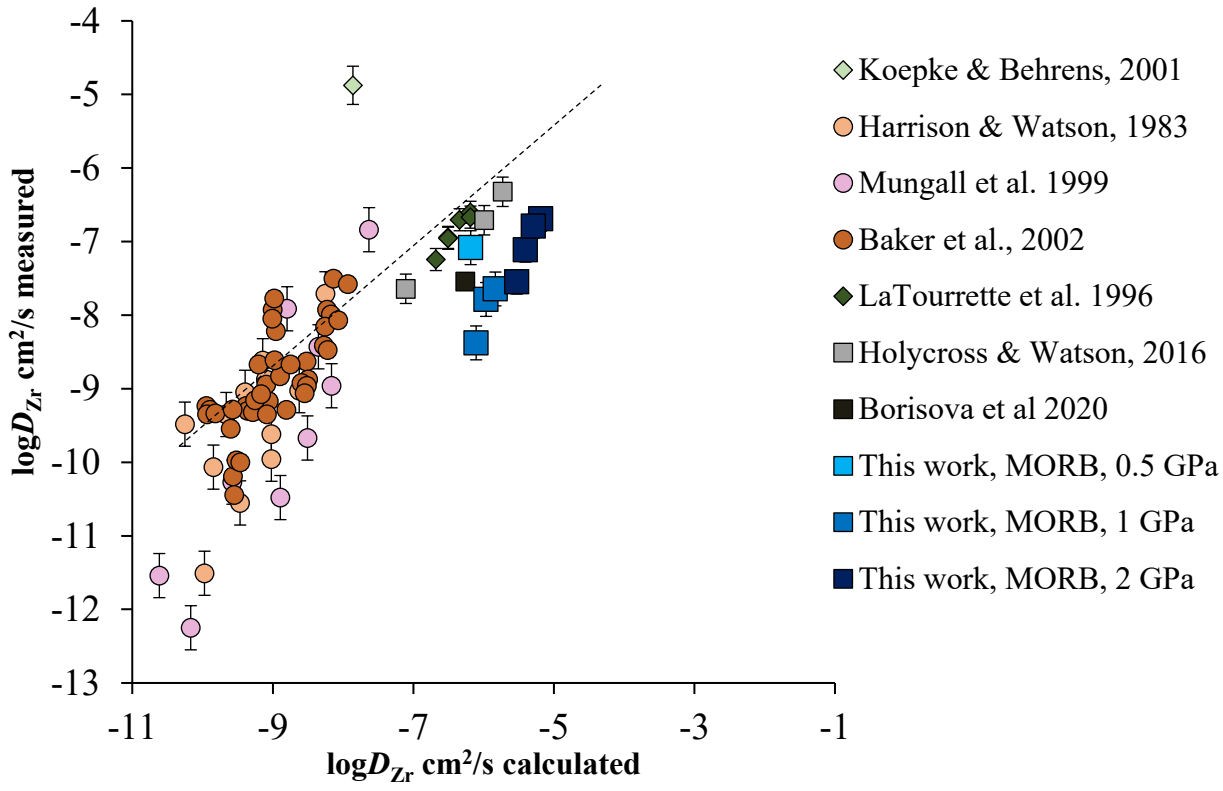

Fig. S7.

Comparison of log D_{Zr} obtained from experiments with that calculated using the Zhang (2016) model. Circles – felsic compositions, squares – basalts, green diamonds – synthetic andesitic melt, dark green diamonds – forsterite-diopside-anorthite melt. The new data of this study for MORB is shown in blue squares. The dashed line indicates where the measured log D_{Zr} equals the log D_{Zr} calculated using the model (1:1).

Table S1.
Starting composition

wt. %	**MORB 3786/3**	**Zircon**
SiO_2	50.31	30.74
Al_2O_3	15.31	0.00
Fe_2O_3	9.90	0.22
MnO	0.17	0.00
MgO	8.21	0.04
CaO	10.29	0.00
Na_2O	3.04	0.00
K_2O	0.31	0.00
TiO_2	1.45	0.00
P_2O_5	0.18	0.00
ZrO_2	0.00	63.96
Total	99.15	94.96

Data S1-S8. (separate file)

EPMA data and Zr diffusion extraction calculations**.**