**Suplementary Table 1** (a) EPMA Calibration settings for olivine, mica, clinopyroxene, amphibole, spinel, ilmenite, K-feldspar and rutile

# Column conditions : Cond 1 :

HV (kV) : 15; I (nA) : 20

# Acquisition informations :

Elt. Line Spec Xtal Peak Pk Time Bg Off1 Bg Off2 Slope/IBg Bg Time Calibration Intensity

 Time/Repeat Range #Channels (cps/nA)

F Ka Sp1 LTAP 71764 10 -800 800 5 Apatite\_15kV\_FKa-Sp1-LTAP 16.1

Na Ka Sp1 LTAP 46372 10 600 1.1 5 albite\_15kV\_NaKa-Sp1-LTAP 119.6

Mg Ka Sp1 LTAP 38509 10 1200 1.16 5 Diopside\_15kV\_MgKa-Sp1-LTAP 285.1

Al Ka Sp1 LTAP 32468 10 600 1 5 Al2O3\_15kV\_AlKa-Sp1-LTAP 1986.2

Si Ka Sp2 TAP 27746 10 600 1.1 5 Th Glass\_15kV\_SiKa-Sp2-TAP 512.4

P Ka Sp5 LPET 70373 10 500 1.1 5 Apatite\_15kV\_PKa-Sp5-LPET 135.5

Cl Ka Sp5 LPET 54059 10 -400 400 5 NaCl\_15kV\_ClKa-Sp5-LPET 437.5

K Ka Sp4 PET 42759 10 500 1.1 5 Orthoclase\_15kV\_KKa-Sp4-PET 66.3

Ca Ka Sp5 LPET 38396 10 500 1.1 5 Diopside\_15kV\_CaKa-Sp5-LPET 323.9

Ti Ka Sp4 PET 31414 10 500 1.1 5 TiO2\_15kV\_TiKa-Sp4-PET 414.7

V Ka Sp3 LLIF 62177 10 850 1.1 5 V\_15kV\_VKa-Sp3-LLIF 443.7

Cr Ka Sp3 LLIF 56869 10 500 1.1 5 CrO3\_15kV\_CrKa-Sp3-LLIF 322.8

Mn Ka Sp3 LLIF 52200 10 500 1.1 5 Rhodonite\_15kV\_MnKa-Sp3-LLIF 158.8

Fe Ka Sp3 LLIF 48085 10 500 1.1 5 Fe2O3\_15kV\_FeKa-Sp3-LLIF 388.8

Ni Ka Sp3 LLIF 41154 10 600 1.05 5 Ni\_15kV\_NiKa-Sp3-LLIF 586.1

Zn Ka Sp3 LLIF 35622 10 500 1.1 5 ZnS\_15kV\_ZnKa-Sp3-LLIF 254.1

Sr La Sp4 PET 78470 20 -1000 1000 10 SrSO4\_15kV\_SrLa-Sp4-PET 43.6

Zr La Sp4 PET 69398 20 -800 800 10 ZrSiO4\_15kV\_ZrLa-Sp4-PET 35.8

Nb La Sp5 LPET 65447 20 -1565 1900 10 Nb\_15kV\_NbLa-Sp5-LPET 273.3

Ba La Sp5 LPET 31713 10 500 1.1 5 BaSO4\_15kV\_BaLa-Sp5-LPET 498.9

(b) EPMA Calibration settings for apatite

# Acquisition informations :

Elt. Line Spec Xtal Peak Pk Time Bg Off1 Bg Off2 Slope/IBg Bg Time Calibration Intensity

 Time/Repeat Range #Channels (cps/nA)

F Ka Sp2 PC0 39395 10 -8500 1000 5 Apatite\_15kV\_FKa-Sp2-PC0 11.1

Na Ka Sp1 LTAP 46372 10 600 1.1 5 albite\_15kV\_NaKa-Sp1-LTAP 119.6

Mg Ka Sp1 LTAP 38509 10 1200 1.16 5 Diopside\_15kV\_MgKa-Sp1-LTAP 285.1

Al Ka Sp1 LTAP 32489 10 600 1.1 5 al\_15kV\_AlKa-Sp1-LTAP 4583.4

Si Ka Sp1 LTAP 27746 10 600 1.1 5 Th Glass\_15kV\_SiKa-Sp1-LTAP 1014.3

Cl Ka Sp4 PET 54050 10 -400 400 5 NaCl\_15kV\_ClKa-Sp4-PET 171.5

K Ka Sp4 PET 42759 10 500 1.1 5 Orthoclase\_15kV\_KKa-Sp4-PET 66.3

Mn Ka Sp3 LLIF 52200 10 500 1.1 5 Rhodonite\_15kV\_MnKa-Sp3-LLIF 158.8

Fe Ka Sp3 LLIF 48085 10 500 1.1 5 Fe2O3\_15kV\_FeKa-Sp3-LLIF 388.8

Ti Ka Sp4 PET 31414 10 500 1.1 5 TiO2\_15kV\_TiKa-Sp4-PET 414.7

Sr La Sp4 PET 78470 20 -1000 1000 10 SrSO4\_15kV\_SrLa-Sp4-PET 43.6

P Ka Sp5 LPET 70373 10 500 1.1 5 Apatite\_15kV\_PKa-Sp5-LPET 135.5

Ca Ka Sp5 LPET 38396 10 500 1.1 5 Diopside\_15kV\_CaKa-Sp5-LPET 323.9

Ba La Sp5 LPET 31713 20 500 1.1 10 BaSO4\_15kV\_BaLa-Sp5-LPET 498.9

La La Sp5 LPET 30445 20 500 1.1 10 La Glass\_15kV\_LaLa-Sp5-LPET 73.1

Ce La Sp5 LPET 29253 20 500 1.1 10 Ce Glass\_15kV\_CeLa-Sp5-LPET 74.9

Pr Lb Sp3 LLIF 56085 20 6230 1.1 10 REE 1\_15kV\_PrLb-Sp3-LLIF 3.8

Nd Lb Sp3 LLIF 53801 20 1700 1.1 10 Nd Glass\_15kV\_NdLb-Sp3-LLIF 10.6

Sm La Sp3 LLIF 54612 20 500 1.1 10 REE 3\_15kV\_SmLa-Sp3-LLIF 6.8

**Overlap corrections**

1. Measured line Ba La ; Overlap from Ti Ka.
2. Measured line: Ce La; Overlap from BaLb.