

New decompositional method of silicate rocks by flux free fusion

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We have performed the new decompositional method of silicate rocks by flux free fusion to determine trace element (Sc, Rb, Sr, Y, Zr, Nb, Cs, Ba, REE and Hf) contents of the whole-rocks especially zircon bearing felsic rock. The method was confirmed by analyses of GSJ (Geological Survey of Japan) reference materials of felsic rocks (JG-3, JR-3, JSd-1). Pellet of powdered sample without flux was weighed accurately and put into a cleaned platinum crucible. Then the sample was fused using a Siliconit tube furnace regulating oxygen fugacity by H₂O-CO₂ gas mixture at QFM- (quartz fayalite magnetite-) buffer. Sample pellet was fused at 1500°C and 1600°C for 2 to 60 minutes and quenched rapidly to room temperature. Glass was then decomposed using HF and HClO₄ in a Teflon jar. Decomposed diluted sample solutions were analyzed using quadrupole ICP-MS. Zr and Hf contents of samples heated at 1500°C for less than 30 minutes were lower than those recommended values, indicating that zircon crystals still survived in the fused glasses. Analyzed data of samples heated at 1500°C for 60 minutes and at 1600°C for greater than 2 minutes were in good agreement of recommended values, indicating that complete decompositions of rock samples. This decompositional method by flux free fusion can also be applied to sample preparations of Hf isotopic analyses of felsic rocks.