Simultaneously determination of U-Pb age and titanium concentration: A case study of the Kurobegawa granite.

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This study presents procedures and results of simultaneous determination of zircon U-Pb age and titanium concentration for a single ablation pit using LA-ICP-MS, which was employed for clarification of the formation process of the Kurobegawa granite. The Kurobegawa granite in the Hida Mountain Range has zircon U-Pb age of 10–0.8 Ma, and thus which is the Earth’s youngest known exposed granitoid pluton (Ito et al., 2013; 2017). In this study, the youngest zircon samples were collected from the felsic rock mass of the central part (Babadani river) of the Kurobegawa granite, which are same location to the sampling site of ‘KRG03 (< 1 Ma)’ of Ito et al. (2013). The U-Pb age of such young zircon is accompanied with small error, and thus which allow us to discuss the variation of ages within a single zircon crystal.

The simultaneous determination was carried out using the triple quadrupole ICP-MS (Agilent8800) housed at the Gakushuin University. MS/MS mass-shift mode with oxygen reaction gas provides reliable and consistent measurement of titanium as $^{48}Ti^{16}O^{+}$. As a result, zircon U-Pb ages range from 1.07 ±0.09 to 0.63 ±0.12 Ma and the titanium concentrations have a range between 0.92 ±0.08 and 16.99 ±0.84 ppm. The obtained U-Pb ages is consistent with the previous data of Ito et al. (2013). The temperature conditions of zircon crystallization were estimated from the geothermometry of Watson et al. (2006). As assumed as a_{TiO2} = 0.3, the crystallization temperature ranges from about 650 to 920 °C.

Keywords: zircon, U-Pb age, Ti in zircon thermometer, LA-ICP-MS, CL image

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