

## Variation of crystallization environment in the Tono pluton, Kitakami Mountains, Northeast Japan

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[http://www.ganko.tohoku.ac.jp/GankoJP/HomePage\(JP\).html](http://www.ganko.tohoku.ac.jp/GankoJP/HomePage(JP).html)

Equilibrium temperatures and oxygen fugacities in the Tono pluton were obtained from the oxides and ferromagnesian minerals. They are different in each rock facies in the pluton. Rocks of the marginal facies are divided into two groups from their intruded areas. Oxygen fugacities in rocks of the low magnetic group were low at the beginning of crystallization, whereas those in the high magnetic group were high at the emplacement. The variation of oxygen fugacities in the main facies changed before the crystallization of hornblende. Oxygen fugacities in the central facies were quite high.

Tono pluton is the largest one of the Cretaceous granitic bodies of the Kitakami Mountains. Rocks of the pluton belong to I-type and magnetite-series granites. Most of the rocks have a magnetic susceptibility between 300 and 500  $\times 10^{-6}$  emu/g; however those of the marginal facies can be divided into two groups, i.e., a high magnetic group of  $>1000 \times 10^{-6}$  emu/g and low magnetic group of  $<100 \times 10^{-6}$  emu/g. Rocks of the high magnetic group intrude into limestone dominated areas; whereas those of the low magnetic group contact with pelitic rock dominated areas. Equilibrium temperatures 840 and 900 °C of orthopyroxene - clinopyroxene were obtained from the marginal facies rocks. The geothermometer of hornblende-plagioclase from the marginal, main and central facies rocks shows temperatures of 700 and 760, 680 and 750 and 710 and 740 °C respectively. One pair of magnetite and ilmenite from the marginal facies rocks shows an equilibrium temperature around 600 °C and NNO buffered line. The variations of oxidation and reduction in each rock facies are as follows: (1) oxygen fugacities in rocks of the low magnetic group were low from the beginning of crystallization, and the temperatures varied along the NNO buffered line. (2) oxygen fugacities of high magnetic group were high at the emplacement, and the temperatures varied along the NNO buffered line at about 600 °C. (3) the slope of the variation of oxygen fugacities in the main facies changed before the crystallization of hornblende at about 750 °C with the crystallization of titanite and hematite. (4) oxygen fugacities in the central facies were quite high in the Tono pluton because of H<sub>2</sub>O dissociation.