R004-01
C 会場 ：9/26　AM1 （9:00-10:30）
9:00〜9:15

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Strong magnetic anomalies record the weak dynamo field of ancient Mars

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Magnetic field observations of the Mars Global Surveyor revealed that there are strong magnetic anomalies arising from the crustal remanences (Acuna et al. 1999, Science), which is estimated to be about 10 times as strong as the Earth's crustal magnetization (Voorhies et al., 2002, JGR). The strong crustal remanences require the particular origin such as the strong dynamo field of the ancient Mars, the high concentration of ferromagnetic mineral in the Martian crust, and so on. However, the origin of strong remanence has not been fully understood. Plagioclase crystals sometimes contain fine-grained magnetite inclusions as the results of exsolution at subsolidus condition (Feinberg et al., 2005, Geology), and the natural remanent magnetization carried by the exsolved magnetite crystals in plagioclase is most likely candidate of the source of Martian magnetic anomaly in terms of the remanence stability and crystallization process (Sato et al. 2018, GRL). In this study, to estimate the paleo-planetary field intensity of Mars based on the crustal remanence records, the magnetic hysteresis measurement combined with microscopic observation and synchrotron radiation study for the single-plagioclase crystals, the remanence acquisition/demagnetization measurements for the assemblages of plagioclase crystals, and the fractional crystallization trend calculations using a rhyolite-MELTS program were conducted. The experimental and calculation results indicate that the Martian crustal rock contains the high-concentration of exsolved magnetite and the exsolved magnetite efficiently acquires the thermoremanent magnetization, resulting in the high remanence acquisition efficiency of the Martian crust.