# Synchrotron X-ray magnetic circular dichroism analysis of strained magnetite from Vredefort granites

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Vredefort crater's granites have shown an anomalous natural remanent magnetization (NRM); strong intensity and stable coercivity of NRM with a random orientation in centimeter scale. It is believed that rod-shaped single-domain (SD) sized magnetite grains were produced along planar deformation features (PDFs) in quartz during the shock event. In our thin section observations, we found no such SD magnetite but a lot of multi-domain (MD) sized magnetite grains (more than 10 micro meter) in the Vredefort granites. These grains of magnetite are too coarse to usually show stable coercivity, but defects or newly crystalized grains by shock event may alter their magnetic characteristics. Therefore, this study focuses on the microtexture of the MD-sized grains of magnetite, and reveals why the MD-sized grains of magnetite have strong and stable coercivity. Okuno (2011MS) showed that both spectroscopic observations of laser micro-Raman spectroscopy and magnetic force microscopy revealed the appearance of striped domains and the existence of hematite lamellae in high coercive MD sized grains of magnetite. To analyze this lamellae structure, we use Spectroscopic Photoelectron and Low Energy Electron Emission Microscope (SPELEEM) at SPring-8. SPELEEM in the combination with synchrotron radiation enable us to obtain element selective magnetic domain structure, local structure at surface and spatially resolved electronic structure simultaneously. Using this, we confirmed the presence of hematite lamella with a striped magnetic domain.