

Identifying the origin of the anomalous magnetization of the Vredefort granites by magnetic microscope

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The Vredefort basement granites carry an abnormal natural remanent magnetism (NRM) with high intensity and a dispersion of magnetic direction within each inch-core sample. It has been thought that fine-grain rod-shaped magnetites along planar deformation features (PDFs) in shocked quartz carry magnetism of plasma-induced magnetic field during impact. To define the carriers of this NRM, we examined thin slab samples of Vredefort granites by means of one-to-one correspondence of surface magnetic image by a custom-made scanning magneto-impedance (MI) microscope and backscattered electron (BSE) image. From these observations, we detected abnormal NRM is carried by either shock-brecciated coarse-grained magnetites or shock-transformed fine-grained magnetite ensemble from biotite. Although it is not rod-shaped magnetites along PDFs, we still argued that the abnormal NRM is acquired under impact-plasma field during Vredefort impact event.