Magnetic Properties of Hydrothermalized A-type Red Granites

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Hydrothermalized A-type granites are commonly identified by their pink to red-brick colour attributed to tiny flakes of hematite in the alkali feldspars. These inclusions can be of interest in magnetic studies, but their timing and process of formation are still unclear. Formation of chlorite after biotite is the commonest effect of hydrother- malization and may occur quite early after crystallization due to late-magmatic or externally-derived fluids. The reddish colour appears at a later stage. Five cases of A-type granites were investigated for their magnetic mineralogy and properties. The selected cases range from nearly unmodified granites (Panafrican stratoid granites of Madagascar) to strongly hydrothermalized ones (Meruoca, Brazil; Tana, Corsica); in- termediate cases are : Mount Scott (Oklahoma), Bushveld (granitic core kindly pro- vided by R.G. Cawthorn) and. Hydrothermal alteration is often associated to a de- crease of the magnetic susceptibility magnitude (K) and of the anisotropy degree (P). It also strongly affects the rockt's bulk coercivity parameters, since alteration changes the relative amounts of coarse-grained primary magnetite, fine-grained PSD to SD sec- ondary magnetite, and hematite. Correspondingly, most samples plot away from the magnetite trend in the Dayt's diagram, but the different groups identified after coer- civity parameters do not directly correlate with whole-rock colour. In addition, IRM- acquisition curves and thermal demagnetization of tri-axial IRM show that hematite occurs in almost all analysed samples despite their colour. Various hematite coercivity ranges are also evidenced. In fact, hematite can be formed either in feldspar crys- tals or after magnetite. Tiny hematite within feldspars can appear either by exsolu- tion process or, more likely, by precipitation from a fluid phase. For these reasons, hematite inclusions may carry a remanence acquired shortly after granite crystalliza- tion or, conversely, a recent chemical remanence due to fluid circulation, unrelated to the magmatic history.

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