Geophysical Research Abstracts, Vol. 9, 08264, 2007
SRef-ID: 1607-7962/gra/EGU2007-A-08264

Distribution and evolution of accessory Fe-Ti oxides in the granitoids

of the Western Carpathians

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In the Western Carpathians magnetite as the most abundant Fe-Ti oxide occurs in early magmatic differentiates of granitoids with I-type affinity, especially in the areas, where assimilation of microgranular mafic enclaves increased the host rock magnetic susceptibility. Concentrations of Fe-Ti oxides and especially magnetite are in granitoids very variable. Locally magnetite reaches even several thousand g/t, but usually only some tenth g/t. Granitoids with I-type affinity always show a weak ferromagnetic behaviour with K around 400 x 10^{-6} SI. Magnetic susceptibility in granitoids which contain microgranular magmatic enclaves is always over 1000 x 10^{-6} SI. Enclaves show higher natural remanent magnetisation and susceptibility values are locally even around 16 000 x 10^{-6} SI. The dikes connected with I-type granite suite also show the increased amount of Fe-Ti oxides and magnetism ($K \sim$ 2000 x 10^{-6} SI).

Fe-Ti oxides are present in granitoids in three generations: (1) the early-magmatic, rich in ulvöspinel component, unstable and preserved only as relic inclusions in accessory and rock-forming minerals, (2) the late-magmatic pure magnetite precipitated along with silicates (mainly with titanite) during the late-stage magmatic crystallisation when primary titanomagnetite reacts with biotite and anorthite, (3) the hydrothermal oxidised form (hematite, rutile) which expanded during cooling regime in plutonic rocks.

Due to inter-oxide re-equilibration of titanomagnetite within late-magmatic/high-temperature hydrothermal stage the release of titanium to ilmenite triggered the il-

menite exsolution and later oxidation of magnetite to hematite as well (maghemitization). Oxythermometry of the Fe-Ti oxides reveals relatively smooth evolution within late-magmatic to subsolidus stages with equilibrated temperatures 730-580˚C and oxygen fugacity close to the FMQ buffer (–2,1 Δlog fO_2 ($\sim$580˚C) 0,2 Δlog fO_2 ($\sim$730˚C). The iron present in both oxidation states (Fe^{2+} and Fe^{3+}) is entering mainly magnetite at the expense of silicates. The increase of oxygen fugacity is connected with the increase of water amount in system but mainly in subsolidus stage. It is concluded that the evolution of Fe-Ti oxides in granitic rocks is a long-termed process involving both magmatic and subsolidus stages.