Geophysical Research Abstracts, Vol. 7, 03343, 2005
SRef-ID: 1607-7962/gra/EGU05-A-03343

Magnetic properties of Icelandic basalts and T-fO2 conditions of its origin

Yu.Genshaft, L.Tikhonov, A.Saltykovsky
ugen@ifz.ru / 007 (095) 2548935 / 007 (095) 2556040

Detailed mineralogical-petrological and petromagnetical investigations of basalts from Iceland (73 samples) were conducted. The main part of the samples studied belongs to toleites by their petrochemistry, ones - belong to transitional or olivine-alkaline type. The basaltic samples of high-iron type ($FeO+Fe_2O_3 > 12\%$) were collected in different places, mainly to the south of Hekla.

The petromagnetic and mineralogic data show that studied basalts posessing different degree of change of the ferromagnetic minerals occur irrespective of age, location and petrochemical type. At least four rock groups with typical Curie points 120-150˚Ñ, 250˚Ñ, 350˚Ñ and 570˚Ñ were determined. The first two groups belong to the primary magmatic titanomagnetites on the base of ferromagnetic minerals chemistry and electron-microscopic study of their structures. The third group is, probably, connected with the secondary phases that are formed during oxidizing decomposition of titanomagnetites. The last group is the low-admixt magnetites – the products of late stage of oxidizing decomposition. A polymodal distribution has been determined for a range of petromagnetic characteristics (for example Hcr) that reflected different contribution of ferromagnetics composition, dimension and structural state.

There is a high correlation between different petromagnetic characteristics and ferromagnetic phase composition peculiarities and basalts (between In and Q, Is and ko, Òñ and alkalinity of the rocks and etc.). The oxidizing conditions are near to QFM buffer in the sub-liquidus and high temperature sub-solidus area of basalts existence (!300 – 800˚Ñ). Near liquidus crystallization of titanomagnetites begins at Ò$\sim$ 1200˚Ñ for most of the studied samples.

The grains of high chromium spinel (contents Cr_2O_3 reach up to 36%) were found in 7 samples. Along with this spinel there are titanomagnetites of different composition,

the contents of TiO_2 decreases with the growth of Cr2O3 content. High chromium spinel is found in tertiary and recent basalts with a variable content of MgO and SiO_2.

This research was supported by the Russian Found of fundamental Investigations 03-05-64078.