

AN ORIGIN OF THE REVERSED REMANENT MAGNETIZATION OF ROCKS

OTO ORLICKÝ

Geophysical Institute of Slovak Academy of Sciences, Bratislava, Slovakia, e-mail:
geoforky@savba.sk

More like one century the field-reversal hypothesis has been accepted to explain an origin of the reversed remanent magnetization (RM) of rocks. The experimental evidences and the theoretical principles do support the self-reversal origin of the RM of several rocks. The recent rhyodacites of the intermediate hematite-ilmenite (Hem-Ilm) composition possess the self-reversed origin of the thermoremanent magnetization (TRM) from localities: Mt. Haruna - Japan, Mt. Shasta - USA, Mt. St. Helen - USA (the self-reversal tendency of the TRM was proven by my results), the 1991 Pinatubo eruption and from three other localities from Philippines. From my study follows that also the titanomagnetite (Ti-Mt) is a source of the self-reversed PTRM in Haruna rhyodacite. I revealed an increase of the reversed intensity of the TRM of Haruna and Olongapo (Philippines) rhyodacite rocks down to -196 °C. I can deduce, that an ordering of the magnetic ions in the crystalline lattice of the Hem-Ilm is the dominant phenomenon of this type of the self-reversal. The second type: The self-reversal of the chemical remanent magnetization (CRM) of rocks due to the reordering of the magnetic ions and so the reversal of spontaneous magnetization in the crystalline A and B sublattices of the ferrimagnetic Ti-Mt - Ti-Mgh solid solutions. My results of basalts from Slovak volcanic fields, Bohemian Massif, Syria and Nigeria have proven that the rocks containing the low-temperature oxidized phase carry the reversed CRM. The self-reversed PTRM was induced also in the artificially prepared basaltic samples and in the andesite and rhyolite samples from about 177 outcrops. The self-reversed CRM of oxidized continental and submarine basalts was revealed also by foreign authors. The third type: The self-reversal RM was revealed in highly-temperature oxidized basalts containing dominantly the Hem-Ilm –es of low Ilm content. No self-reversal RM (TRM or CRM) is present in the volcanic rocks containing either the pure magnetite or the Ti-rich Ti-Mt without the low-temperature oxidized phase.

Self-reversal

Oto Orlický, Geophysical Institute of Slovak Academy of Sciences, Bratislava, Slovakia, e-mail: geoforky@savba.sk