The origin of RM and magnetic mineralogy of the Palaeozoic melaphyres from Western Carpathian Mts. and dominantly of intrusive volcanics from the Red Sea Hills, the Sudan Republic (Part X)

O. Orlický
Geophysical Institute of the Slovak Academy of Sciences[1]

Abstract: The Upper Permian melaphyres, of age 230 to 250 mil. years, from the Low Tatra Mts., and the Cambrian volcanics of the 500 to 570 mil. years, from the Red Sea Hills, the Sudan Republic were studied. We are concerned with very old rocks, so the original magnetism carriers - the Fe-Ti oxides have undergone long-term alterations during their existence in the field. Only exclusively there are few grains of the original Fe-Ti oxides in these rocks. The magnetic phases with high contents of ulvöspinel, which are typical for young basalts are not present in these rocks. The Fe-Ti magnetic minerals in these old volcanic rocks are dominantly the magnetite (Mt), hematite (Hem), the titanomaghemite (Ti-Mgh), which are of the secondary origin. Only rarely few grains of titanomagnetites (Ti-Mt-es) and scarcely ilmenite-hematites (Ilm-Hem-es) may correspond to original state in the rocks. The remanent magnetism (RM) is carried dominantly by the above mentioned secondary magnetic minerals. This RM is of the chemical CRM origin. It is not possible to determine the time of their origin. We can infer from the results, that the original thermoremanent magnetization (TRM) has not survived in these old rocks. The reversed RM of rocks was explained on the basis of the self-reversal hypothesis. The rocks with a stable reversed RM had contained at the time of their origin probably Ilm-Hem-es with a high portion of ilmenite, e.g. with Ilm_{42} - Ilm_{72} and a self-reversal TRM was acquired. But the original composition of Ilm-Hem-es was successively changed, may be according to the formula $Ilm_{42}Hem_{58} \rightarrow Ilm_{15}Hem_{85} \rightarrow$ Hem + Psb. Because this process takes place in the presence of magnetizing geomagnetic field and that of very strong reversed self-reversal field in magnetic Ilm-Hem minerals in the rocks, new RM - the CRM, but still of the reversed sense, is generated. If there are dominantly the hematites due to alteration of original Ilm-Hem-es, or other Fe-Ti oxides, only a positive CRM in the rocks has been acquired. This CRM is of dominant portion in the studied rocks. But there may be also a small portion of very soft original TRM present

[1] Dúbravská cesta 9, 845 28 Bratislava, Slovak Republic; e-mail: geoforky@savba.sk

in melaphyres, exclusively also in the Cambrian volcanic rocks which are characterized by high values of magnetic susceptibility in the rocks.

Key words: the Upper Permian melaphyres and the Cambrian volcanic; secondary magnetic minerals - Mt, Hem and Ti-Mgh, normal and reversed CRM, volcanic rocks, rock magnetism