REE IN TEKTITES

V. BOUŠKA

Department of Geochemistry , Mineralogy and Mineral Resources, Faculty of Science, Charles University, Albertov 6, 128 43 Prague 2, Czech Republic

Tektites are usually small, rounded, natural acidic silicate glasses, brown or green in colour. The glass has a fluidal texture marked by schlieren and commonly contains particles of pure quartz glass (lechatelierite) formed by fusion of quartz grains. The chemical composition of tektites manifests close similarity with the sedimentary and residual rocks as well as soils of the Earth's surface. The silica content in tektites is greater than would be expected on the basis of the mafic oxide content, corresponding to sedimentary rocks as the source material.

Tectites are characterized by an excess of alumina compared to igneous rocks and low content of alkalies. The average chemical composition of tektites and microtektites (n = 458) is: 75.56 wt. % SiO_2, 0.60 % TiO_2, 12.67 % Al_2O_3, 4.06 % FeO_{total} (n = 284), 0.08 % MnO (n = 245), 3.18 % MgO, 2.64 % CaO, 1.13 % Na_2O, 2.47 % K_2O and 0.05 % P_2O_5 (n = 102). The content of H_2O is smaller than 0.020 wt. %.

The REE distribution in tektites is similar to that for terrestrial sedimentary sandstone/claystone series or their petrographic equivalent. Fig. 1 depicts the field of REE contents in tektites normalized to chondrites. For comparison, the NASC standard was plotted showing a similar curve to tektites with the highest contents of REE. Granitic rocks with similar silica contents contain more LREE and less HREE than tektites. The normalized curve of REE with respect to chondrites is steeper in granitic rocks with a deeper negative anomaly for europium. Of the tektites found in the Czech Republic (moldavites), the Moravian finds have the highest REE contents (Σ = 150.6 ppm; n = 25). Commonly, the less siliceous tektites which are also darker in colour have higher REE contents.

Most of the tektites display a depletion in Eu, a characteristic feature of mature Phanerozoic continental sedimentary clayey rocks. However, the Ivory Coast tektites are relatively enriched in Eu, even though their total abundance of REE is lower. This could be influenced by the petrographic character of the original Precambrian rock source. In the case of Georgia tektites which exhibit only a slight increase in Eu relative to chondrites, the source material could be probably rich in feldspar, e.g. feldspatic sandstone. Such interpretation is supported by alkalies and calcium content of these tektites.

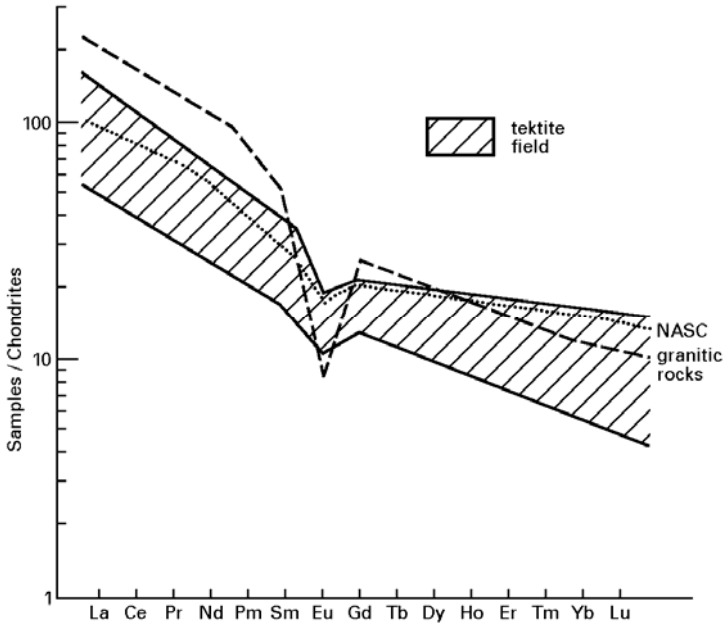

Fig. 1. The REE distribution in tektites (normalized by chondrites). For comparison, the distribution of the rare earth elements contents in North American shales (NASC) and granitic rocks is also given.