PARTITIONING OF RARE EARTHS BETWEEN IMMISCIBLE SILICATE AND FLUORIDE MELTS AND THE ORIGIN OF THE LANTHANIDE TETRAD EFFECT IN IGNEOUS ROCKS

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Using high-temperature centrifuge furnace and rapid-quench cold-seal pressure vessels we have studied major element and REE partitioning between immiscible silicate and fluoride melts. The centrifuge furnace provided means for effective separation of the immiscible phases into two distinct layers separated by sharp meniscus. Thus, it was possible to split the quenched sample and analyse the layers for REE by solution-based ICP-MS. The analytical method was accurate enough to observe for the first time the lanthanide tetrad-effect at high, magmatic temperatures. The effect is related to subtle changes in bond strength and complexing behaviour of lanthanides due to gradual filling of 4-f electron shell and may account for the unusual chondrite-normalised REE patterns in some F-rich pegmatites and granites (Bau, 1998).

Electronic Scientific Information Journal "Herald of the Department of Earth Sciences RAS" № 1(21)'2003
Informational Bulletin of the Annual Seminar of Experimental Mineralogy, Petrology and Geochemistry – 2003
URL: http://www.scgis.ru/russian/cp1251/h_dgggms/1-2003/informbul-1_2003/magm-26e.pdf
Published on July 15, 2003