

Mineralogical and geochemical studies of the Afyon volcanics, West Central Anatolia, Turkey: Preliminary results

G.D. DOĞAN^{1*}, A. TEMEL¹, A. GOURGAUD² AND H. DEMIRBAĞ³

¹Hacettepe University, Department of Geological Engineering, 06800, Beytepe-Ankara, Turkey
(*correspondence: gdeniz@hacettepe.edu.tr)
(atemel@hacettepe.edu.tr)

²Université Blaise Pascal, OPGC, Laboratoire CNRS "Magmas et Volcans" 5 rue Kessler-63038, Clermont-Ferrand Cedex, France
(gourgaud@opgc.univbpclermont.fr)

³Maden Tetkik ve Arama Genel Müdürlüğü, Jeoloji Etüdüleri Daire Başkanlığı G Blok, Ankara-Turkey
(demirbag@mta.gov.tr)

This study represents mineralogical and geochemical characteristics of the Afyon volcanics which are located in the west central Anatolia, Afyon-Turkey. Samples were taken from lava flows, domes and, block and ash flows. Mineralogical and petrographical studies show that all the samples are fined-grained and exhibit porphyritic texture. Afyon volcanics consist of plagioclases, sanidine, phlogopite (Mg#₇₄₋₉₄), biotite (Mg#₅₃₋₆₆), amphibole, cliopyroxene, orthopyroxene, apatite, hematite and ilmenite phenocrysts. Microprobe studies reveal that plagioclases are identified as labradorite-oligoclase (An₃₋₆₃), amphibole minerals are tschermakite, richterite, magnesiohornblend (Mg#₅₄₋₈₁), cliopyroxenes are diopside, augite (Wo₄₃₋₄₇) and orthopyroxenes are hypersthene (En₄₀₋₇₄) in composition. The presence of both normally and reversed zoned feldspars suggest that these volcanics can be affected by magma mixing process. Based on geochemical analyses Afyon volcanics are composed of trachyandesite, trachydasite and trachyte and, they have alkaline characteristics. Fractional crystallization process is observed from major element versus SiO₂ diagrams.

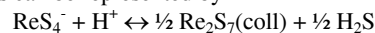
Aqueous geochemistry of Rhenium in sulfidic environments

M.K. DOLOR* AND G.R. HELZ

Chemistry and Biochemistry, University of Maryland, College Park MD 20742 (mdolor@umd.edu)

We explore the hypothesis that reaction with sulfide transforms Re from a highly soluble to a particle reactive form in reducing marine environments. Exposing perrhenate (ReO₄⁻) to sulfide leads to formation of thioperrhenates (ReO_nS_{4-n}⁻), which can be recognized by their characteristic UV-Vis absorption spectra. However, ReO₃S⁻ and ReS₄⁻ are the only thioperrhenates observed in experiments that have continued in some cases for more than 4 years. The intermediate thioperrhenates (ReO₂S₂⁻ and ReOS₃⁻) are apparently extremely unstable and short-lived, a result that was anticipated by Tossell [1] based on theoretical calculations. Sulfidation of ReO₄⁻ appears to be acid catalyzed, like the analogous sulfidation of MoO₄²⁻ [2].

Obtaining a stability constant for ReS₄⁻ is difficult because polymerization reactions intervene, interfering with optical determinations of ReS₄⁻. Rhenium sulfide sols are produced and can be stable for years. To a first approximation, an equilibrium between dissolved and colloidal Re polymer in sulfidic waters can be represented by:



Curiously, this reaction suggests that very low-sulfide pore waters, such as would be found in suboxic sediments, would be more favorable for colloid formation than highly sulfidic pore waters. However, the above reaction incompletely describes colloid formation, which seems to be enhanced by presence of polysulfides. Polysulfides have been found to be a structural element of the colloids [3]. Currently we are investigating the possibility that sorption of colloids by mineral surfaces fixes Re in suboxic sediments.

[1] Tossell J. A. (2005) *Geochim. Cosmochim. Acta* **69**, 2497-2503. [2] Erickson B. E. and Helz, G. R. (2000) *Geochim. Cosmochim. Acta* **64** 1149-1158. [3] Schwarz D. E., Frenkel A. I., Nuzzo R. G., Rauchfuss T. B., and Vairavamurthy A. (2004) *Chemistry of Materials* **16** 151-158.