

Accepted Manuscript

Geochemistry of Molybdenum in the Continental Crust

Allison T. Greaney, Roberta L. Rudnick, Richard M. Gaschnig, Joseph B. Whalen, Béatrice Luais, John D. Clemens

PII: S0016-7037(18)30373-9
DOI: <https://doi.org/10.1016/j.gca.2018.06.039>
Reference: GCA 10828

To appear in: *Geochimica et Cosmochimica Acta*

Received Date: 9 October 2017
Revised Date: 25 June 2018
Accepted Date: 30 June 2018

Please cite this article as: Greaney, A.T., Rudnick, R.L., Gaschnig, R.M., Whalen, J.B., Luais, B., Clemens, J.D., Geochemistry of Molybdenum in the Continental Crust, *Geochimica et Cosmochimica Acta* (2018), doi: <https://doi.org/10.1016/j.gca.2018.06.039>

This is a PDF file of an unedited manuscript that has been accepted for publication. As a service to our customers we are providing this early version of the manuscript. The manuscript will undergo copyediting, typesetting, and review of the resulting proof before it is published in its final form. Please note that during the production process errors may be discovered which could affect the content, and all legal disclaimers that apply to the journal pertain.



Geochemistry of Molybdenum in the Continental Crust

Allison T. Greaney^{1,2*}, Roberta L. Rudnick^{1,2}, Richard M. Gaschnig^{1,3}, Joseph B. Whalen⁴,
Béatrice Luais⁵, John D. Clemens⁶

¹University of Maryland College Park, Department of Geology, College Park, MD 20742

²*present address*: University of California Santa Barbara, Department of Earth Science and Earth Research Institute, Santa Barbara, CA, USA 93106

³*present address*: University of Massachusetts Lowell, Department of Environmental, Earth, and Atmospheric Science, Lowell, MA, USA 01854

⁴Geological Survey of Canada, Central Canada Division, Ottawa, Ontario, Canada K1A0E8

⁵Centre de Recherches Pétrographiques et Géochimiques – CRPG, CNRS - UMR 7358, Université de Lorraine, 54501 Vandoeuvre-les-Nancy Cedex, France

⁶Stellensbosch University, Department of Earth Sciences, Matieland, 7600 South Africa

*corresponding author: greaney@umail.ucsb.edu

Abstract

The use of molybdenum as a quantitative paleo-atmosphere redox sensor is predicated on the assumption that Mo is hosted in sulfides in the upper continental crust (UCC). This assumption is tested here by determining the mineralogical hosts of Mo in typical Archean, Proterozoic, and Phanerozoic upper crustal igneous rocks, spanning a compositional range from basalt to granite. Common igneous sulfides such as pyrite and chalcopyrite contain very little Mo (commonly below detection limits of around 10 ng/g) and are not a significant crustal Mo host. By contrast, volcanic glass and Ti-bearing phases such as titanite, ilmenite, magnetite, and rutile contain significantly higher Mo concentrations (e.g., up to 40 µg/g in titanite), and can account for the whole-rock Mo budget in most rocks. However, mass balance between whole-rock and mineral data is not achieved in 4 out of 10 granites analyzed with *in-situ* methods, where Mo may be hosted in undetected trace molybdenite. Significant Mo depletion (i.e., UCC-normalized

Download English Version:

<https://daneshyari.com/en/article/8910589>

Download Persian Version:

<https://daneshyari.com/article/8910589>

[Daneshyari.com](https://daneshyari.com)