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Research Profile

My area of research is experimental petrology, aimed at experimentally simulating conditions within the Earth in order to understand fundamental petrological and geochemical processes. One aspect of this has been the development of quantitative models to predict trace element partitioning between crystals and melts during igneous processes. This research uses high pressure-high temperature experiments in conjunction with microanalysis of mineral and melt phases and theory based on the elastic properties of the minerals.

A second major interest is the conditions under which the Earth and other terrestrial planets formed and differentiated into silicate crusts, silicate mantles and iron-rich metallic cores. This uses high pressure, high temperature experiments coupled to thermodynamic calculations and isotopic measurements of meteoritic and planetary materials. The experiments generate, for example, a small sample (10 mgm) in which a ball of metal has segregated from a metal-silicate mixture. We chemically analyse the different parts of sample in order to determine the partitioning of specific elements between metal and silicate under the physical conditions of interest. In this way we determine the extent to which elements enter the metal (siderophile character) or the silicate (lithophile). The experimental partitioning is then compared with that observed on the Earth (between core and mantle) in order to understand the core formation process.

Teaching Profile

First year- Thermodynamics

Second Year- High temperature geochemistry

Fourth Year- Planetary Chemistry

Selected Publications

- Williams, Helen M., Wood, Bernard J., Wade, Jon, Frost, Daniel J., Tuff, James, *Isotopic evidence for internal oxidation of the Earth's mantle during accretion*, *Earth Planet.Sci.Lett.*, 2012 DOI (10.1016/j.epsl.2011.12.030)
- Wade, Jon, Wood, Bernard J., Tuff, James, *Metal-silicate partitioning of Mo and W at high pressures and temperatures: Evidence for late accretion of sulphur to the Earth*, *Geochim.Cosmochim.Acta*, 2012 DOI (10.1016/j.gca.2012.01.010)
- Wade, Jon, Wood, Bernard J., *Metal-silicate partitioning experiments in the diamond anvil cell: A comment on potential analytical errors*, *Phys.Earth Planet.Inter.*, 2012 DOI (10.1016/j.pepi.2011.12.002)
- Tuff, James, Wood, Bernard J., Wade, Jon, *The effect of Si on metal-silicate partitioning of siderophile elements and implications for the conditions of core formation*, *Geochim.Cosmochim.Acta*, 2011 DOI (10.1016/j.gca.2010.10.027)
- Martin, Laure A. J., Wood, Bernard J., Turner, Simon, Rushmer, Tracy,

"Experimental Measurements of Trace Element Partitioning Between Lawsonite, Zoisite and Fluid and their Implication for the Composition of Arc Magmas", *J.Petrol.*, 2011 DOI (10.1093/petrology/egr018)

- Wood, Bernard J., Halliday, Alex N., *The lead isotopic age of the Earth can be explained by core formation alone*, *Nature*, 2010 DOI (10.1038/nature09072)
- Wood, B. J., Halliday, A. N., Rehkamper, M., *Volatile accretion history of the Earth.*, *Nature*, 2010
- Wood, Bernard J., Turner, Simon P., *Origin of primitive high-Mg andesite: Constraints from natural examples and experiments*, *Earth Planet.Sci.Lett.*, 2009 DOI (10.1016/j.epsl.2009.03.032)
- Wood, Bernard J., Halliday, Alex N., *Lead was strongly partitioned into Earth's core and not lost to space*, *Geochim.Cosmochim.Acta*, 2009
- Wade, J., Wood, B. J., Elliott, T. R., Walter, M. J., *Enstatite chondrite and related Earth models*, *Geochim.Cosmochim.Acta*, 2009
- Rehkamper, M., Baker, R. G. A., Wood, B. J., *Tl isotope constraints on the origin of the Earth's Pb paradox*, *Geochim.Cosmochim.Acta*, 2009
- Wood, Bernard J., Wade, Jon, Kilburn, Matthew R., *"Core formation and the oxidation state of the Earth: Additional constraints from Nb, V and Cr partitioning"*, *Geochim.Cosmochim.Acta*, 2008 DOI (10.1016/j.gca.2007.11.036)
- Wood, Bernard J., Nielsen, Sune G., Rehkamper, Mark, Halliday, Alex N., *The effects of core formation on the Pb- and Tl- isotopic composition of the silicate Earth*, *Earth Planet.Sci.Lett.*, 2008 DOI (10.1016/j.epsl.2008.01.027)
- Wood, Bernard J., *Accretion and core formation: constraints from metal-silicate partitioning*, *Philosophical Transactions of the Royal Society A-Mathematical Physical and Engineering Sciences*, 2008 DOI (10.1098/rsta.2008.0115)
- Williams, H. M., Wood, B. J., Halliday, A. N., *"Experimental determination of Fe isotope fractionation between liquid metal, silicate and sulfide at high pressures and temperatures"*, *Geochim.Cosmochim.Acta*, 2008
- Hill, Eddy, Blundy, Jonathan D., Wood, Bernard J., *"Clinopyroxene-melt trace element partitioning and the development of a predictive model for HFSE and Sc (vol 161, pg 423, 2011)"*, *Contributions to Mineralogy and Petrology*, 2012 DOI (10.1007/s00410-011-0716-2)
- Hill, Eddy, Blundy, Jonathan D., Wood, Bernard J., *Clinopyroxene-melt trace element partitioning and the development of a predictive model for HFSE and Sc*, *Contributions to Mineralogy and Petrology*, 2011 DOI (10.1007/s00410-010-0540-0)
- Grant, Kevin J., Wood, Bernard J., *"Experimental study of the incorporation of Li, Sc, Al and other trace elements into olivine"*, *Geochim.Cosmochim.Acta*, 2010 DOI (10.1016/j.gca.2010.01.015)
- Grant, Kevin J., Wood, Bernard J., *"Experimental study of the incorporation of Li, Sc, Al and other trace elements into olivine (vol 74, pg 2412, 2010)"*, *Geochim.Cosmochim.Acta*, 2010 DOI (10.1016/j.gca.2010.04.004)
- Grant, K. J., Wood, B. J., *Alkali activities in silicate melts*, *Geochim.Cosmochim.Acta*, 2008
- Corgne, Alexandre, Wood, Bernard J., Fei, Yingwei, *C- and S-rich molten alloy immiscibility and core formation of planetesimals*, *Geochim.Cosmochim.Acta*, 2008 DOI (10.1016/j.gca.2008.03.001)
- Corgne, Alexandre, Keshav, Shantanu, Wood, Bernard J., McDonough, William F., Fei, Yingwei, *Metal-silicate partitioning and constraints on core composition and oxygen fugacity during Earth accretion*, *Geochim.Cosmochim.Acta*, 2008 DOI (10.1016/j.gca.2007.10.006)

- Corgne, A., Wood, B. J., *How much heat and REE in calcium silicate perovskite?*, *Geochim.Cosmochim.Acta*, 2008
- Corgne, A., Wood, B. J., *Element partitioning during core formation*, *Geochim.Cosmochim.Acta*, 2008
- Baker, R. G. A., Wood, B. J., Rehkaemper, M., Schoenbaechler, M., Nielsen, S. G., *Core formation and the Pb and Tl isotope evolution of the silicate Earth*, *Geochim.Cosmochim.Acta*, 2008