

Experimental insights into the geochemistry of Mercury

Kathleen E. Vander Kaaden, Jacobs, NASA Johnson Space Center, Mail Code XI3, Houston, TX 77058.

With the recent estimate of Mercury's surface composition from the X-Ray Spectrometer and Gamma-Ray Spectrometer that were onboard NASA's MErcury Surface, Space ENvironment, Geochemistry and Ranging (MESSENGER) spacecraft, we now have our first opportunity to directly investigate the compositions of lavas from the planet Mercury and indirectly investigate the chemical make-up of its interior. Results from MESSENGER showed exotic surface compositions with more than 3 wt% sulfur in some lavas and relatively low amounts of iron (less than 3 wt%) across the surface. These striking features are consistent with magmatism occurring under highly reducing conditions which has an impact on the thermal and chemical evolution of a planetary body. Here we'll explore the geochemical evolution of Mercury through a series of experimental studies and discuss the implications of low oxygen fugacity on elemental behavior and magmatic processes.