Recommended Maximum Temperature for Mars Returned Samples

This abstract describes scientific constraints for the maximum temperature of the samples to be collected by the Mars 2020 sample-collecting rover.

Ar-Ar data confirm an early Amazonian age for NWA 8159. Martian atmospheric Xe, either from the early Amazonian or a later shock event, is present in NWA 8159.

We report the first Ar/Ar ages of the paired nakhlites MIL 090030, 090032 and 090136. We report crystallization ages of ~1.4 Ga and aqueous alteration of ~0.7 Ga.

Shockingly unshocked, from a unique depleted martian mantle reservoir and launched ~16 million years ago. New isotopic data for intermediate shergottites too.

NWA 10169 is a new lherzolitic shergottite with a bulk REE profile and mineral composition that closely resemble the enriched lherzolitic shergottites.

We examine magnetite-orthopyroxene intergrowths in NWA 8159 to determine whether they are magmatic or subsolidus in origin.


Martian meteorite Tissint underwent a unique petrogenesis through martian mantle and crust, recorded by different generations of olivine-hosted melt inclusions.
Trace Elements in Martian Meteorites and the Olivine Peritectic Reaction: Insights from Tissint
Experimental Petrology [#2467]
Results of experimental investigation of Tissint, specifically the role of oxidation during crystallization; application to shergottites and martian volcanism.

Melting Conditions of Alkali- and Phosphorus-Rich Primary Magmas from the Martian Mantle [#2837]
Low-degree experimental melts constrain the incongruent melting reactions of the martian mantle and the effect of variable amounts of phosphorus.

The Mineralogy, Geochemistry, and Redox State of Multivalent Cations During the Crystallization of Primitive Shergottitic Liquids at Various fO2: Insights into the fO2 of the Martian Mantle and Crustal Influences on Redox Conditions of Martian Magmas [#1373]
This presentation explores the effect of fO2 on the liquid line of descent (LLD) for primitive shergottite liquid compositions.

Basaltic Shergottite Northwest Africa 856: Differentiation of a Martian Magma [#2126]
The crystallization history of an enriched basaltic shergottite, NWA 856, constrains differentiation processes in martian magmatic systems.

Rare earth element variations during resupply of active martian magma chambers.

Lithium and Lead Isotopic Signatures of Martian Sub-Surface Components Recorded in Shergottites Phosphates [#1843]
We present our preliminary in-situ δ7Li analyses of shergottites phosphates along with U-Pb data. These phosphates might provide martian crustal information.

Investigating the History of Proto-Breccia Clasts in Martian Regolith Breccia Northwest Africa 7034 [#2787]
Proto-breccia clasts are identified and their histories evaluated using SEM and C-T data, in martian brecciated meteorite NWA 7034.

New chemical data from igneous-textured clasts within NWA 7034 provides insight into their formation history and suggests they derive from separate sources.

Hydrogen Isotopic Composition of Apatite in Northwest Africa 7034: A Record of the “Intermediate” H-Isotopic Reservoir in the Martian Crust? [#1326]
Reservoirs abound / Is hydrogen in the mix? / We may never know.

NWA 8114 pyroxene recrystallised and oxidised to magnetite and amorphous silicate, with later low-T goethite formation, shown by TEM and synchrotron FTIR, XRD.
Peslier A. H.  Cintala M. J.  Montes R.  Cardenas F.  

**POSTER LOCATION #482**

*FTIR Analysis of Water in Pyroxene and Plagioclase in Allan Hills 84001 and Nakhlites [#1173]*

Degassing and shock control the water content of pyroxene and plagioclase/maskelynite in ALH 84001 and nakhlites.

Martin A. M.  Médard E.  Lanzirotti T.  

**POSTER LOCATION #483**

*3D-Mapping of Fayalite Oxidation Using Synchrotron: Implications for Volatiles Evolution During Planetary Crust Formation [#3059]*

We present Fe redox maps of oxidized fayalite crystals oriented in three crystallographic directions, and constrain the evolution and role of volatiles.

Takenouchi A.  Mikouchi T.  

**POSTER LOCATION #484**

*Iron Micro-XANES Analysis of Colored Olivine in Martian Meteorites [#1755]*

We analyzed various colored olivine in ten martian meteorites by SR-XANES and considered their formation processes combining previous SEM observation results.

McKeeby B. E.  Mahmood S.  Lowe M.  Greenwood J. P.  

**POSTER LOCATION #485**

*An Investigation of Jarosite and Associated Alteration Mineralogy in Martian Meteorite Roberts Massif 04262 Using Micro-Raman Spectroscopy [#1311]*

Martian thin section RBT 04262,30 was studied using a micro-Raman spectroscopy, SEM BSE and EDS. Jarosite was imaged as vein fill cutting sulfate grains.


**POSTER LOCATION #486**

*Electron Probe Microanalysis, Micro X-Ray Diffraction, and Deuterium-Hydrogen Analysis of Hydrous Alteration in Martian Meteorites Northwest Africa 10416 and 8159 [#2538]*

Altered olivine grains in NWA 8159 and 10416 were analyzed by electron microprobe. NWA 10416 was further analyzed by micro-XRD and D/H mass spectrometry.


**POSTER LOCATION #487**

*Coordinated In Situ NanoSIMS Analyses of H-C-O Isotopes in Allan Hills 84001 Carbonates [#1780]*

This study provides a new estimate on the hydrogen isotopic composition (D/H = ~1.5-2×SMOW) of the Noachian surface water.

Izawa M. R. M.  Schmidt M. E.  Berger J. A.  Gellert R.  

**POSTER LOCATION #488**

*Evaluating the Influence of Magmatic Sulphides on Chalcophile Element Enrichments in the Bradbury Assemblage, Gale Crater, Mars, Using APXS Measurements [#2705]*

Chalcophile element enrichments in Gale crater measured by APXS may be influenced by magmatic sulphides.

Adcock C. T.  Tschauner O.  Hausrath E. M.  

**POSTER LOCATION #489**


Results and implications of shock-recovery experiments and synchrotron studies on Mars-relevant phosphate minerals.

Walton E. L.  Tschauner O.  Herd C. D. K.  Agee C. B.  

**POSTER LOCATION #490**

*Shock Effects in New Martian Olivine Basalt Northwest Africa 10416: Distinct from Shergottites but Akin to Northwest Africa 8159 [#1639]*

Shock effects in new martian basalt NWA 10416 are described which imply a relatively low shock pressure but longer shock duration compared to shergottites.
Hu J. Sharp T. G.  
**POSTER LOCATION #491**  
**Shocked Feldspar in Martian Meteorites: Evidence Against Pervasive Melting and Resetting** [#2542]  
We investigate the textures of shock-induced feldspar glass in martian meteorites and suggest the amorphization occurs mostly under moderate to low temperature.

Kaiden H. Misawa K. Niihara T.  
**POSTER LOCATION #492**  
**Model for the Shock-Resetting Conditions of Uranium-Lead Systematics of Baddeleyite: Implications for Martian Meteorite Chronology** [#3019]  
We evaluated the conditions of shock-resetting of U–Pb isotopic systematics in baddeleyite and conclude that U-Pb isotopic systematics was not disturbed.