ʒenous volatile Chapter

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ctions as indicated below.

ırnes (post-doc), Romain Tartèse (post-doc), Jeremy Boyce, and Francis McCubbin:
iew/synthesis on current state of apatite compositions (abundances and isotopic
npositions) in lunar samples

(Nanjing University), Yang Liu: Review/synthesis on current state of volatile abundances ıominally anhydrous mineral phases (moderately to highly volatile)

y, Jeremy Boyce, Yang Liu, Francis McCubbin: review/synthesis on current state of volatile ındances in and isotopic compositions of lunar pyroclastic glasses (moderately to highly atile)

agna, James Day, Francis McCubbin, Stephen Elardo: review/synthesis on current state of atile abundances in and isotopic compositions of lunar basalts (moderately to highly atile)

PhD candidate), Yang Liu: review/synthesis on current state of volatile abundances and :opic compositions of volatiles (moderately to highly volatile) in melt inclusions from lunar ıples

Vander Kaaden (post-doc), Stephen Elardo (post-doc), Francis McCubbin, Jeremy Boyce: ıerimental constraints on mineral-melt partitioning of moderately to highly volatile ments under lunar conditions

-s will contribute to the synthesis and discussion portion of the chapter

tline:

ın:

ition: magmatic volatiles (e.g., H, F, Cl, S), versus geochemical volatiles (e.g., K, n). We will discuss our approach of understanding both types of volatiles in lunar es and lay the ground work for how we will determine the overall volatile budget of oon.

ıg H in lunar samples is ground breaking. The amount of H is low, but nontrivial. mounts found in pyroclastic glass, nominally anhydrous minerals, olivine-hosted ions and apatite represent an increase of an order to six orders of magnitude ared to the value accepted in the science community before 2008.

tance of volatiles in the Newer Views of the Moon: origin of Moon, magma entiation [point to the overlapping chapters for complementary discussion and ıce], volcanisms, secondary processes in surface and crust interactions (shorter uctory paragraph that sets up all of the volatile processes to be discussed in quent chapters)

ubject order: We will start by with 1-2 paragraph review each subject section lusions, mare basalts, pyroclastic glasses, apatite, and nominally anhydrous :luding new results published since the 2015 Am Min review paper on lunar

:ock compositions and stable isotopic compositions of moderately to highly volatile nts in lunar basalts (i.e., mare basalts, lunar meteorites, KREEP basalts, etc)

ile abundances, and where possible, isotopic compositions of melt inclusions hosted
ıre basalts.
nic glasses as beads or as inclusions or as bulk rocks: direct measurements of
les in the magma, but subject to degassing
:e: ubiquitous in diverse rocks and thus a window into different processes, but
:t to partition effects (story is also improving), fractionation and degassing
nally anhydrous minerals: more ubiquitous and have been shown on Earth to
n ppm to 100's ppm OH with a correlation to P, but are difficult to analyze and
:t to unconstrained partitioning effects (story is also improving)

sample abundances to understand the source region and potential

al-melt partitioning for NAM-melt and apatite-melt of moderately to highly volatile
nts
e of partial melting estimates and relation to the source
s in using sample data, degassing, fractional crystallization effects on apatite,
ilation etc

ıs:

esis of trends for volatiles, place in context of geochemical affinities and
ations (i.e., chalcophile, siderophile, lithophile)
le source volatiles: abundances and distribution and processes affecting them,
:ed Intrinsic volatility scale for the Moon

k/Outstanding Questions:

fide mantle rocks for above approaches
sample return mission
ved partitioning models
ted and correlated analyses in samples to link timing of crystallization and
osition