

Astronomy 101
Monday, Wednesday, Friday
10:10 – 11:00 am

Tom Burbine
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Grades

This Fall

- I am teaching Planetary Science - ASTRON 223

To get extra homework points

- Every Wednesday at noon, I will have lunch at **the Hatch**
- If you join me for at least 5 minutes, I will give you a homework point
- I am also having a seminar series at Mount Holyoke
- If you come to a lecture and tell me you are there, you will get a homework point

Introduction to Meteorites

Seminar Series



Thursdays
4:15-5:15 pm
Kendade Hall 305
Mount Holyoke College

March 30 - Experimental Petrology - Lindy Elkins-Tanton (Brown University)

April 6 - Martian Meteorites - Allan Treiman (Lunar and Planetary Institute)

April 13 - Lunar Meteorites - Barbara Cohen (University of New Mexico)

April 20 - Iron Meteorites - Nancy Chabot (JHU Applied Physics Laboratory)

April 27 - Carbonaceous Chondrites - Adrian Brearley (Univ. of New Mexico)

May 4 - Basaltic Meteorites - Duck Mittlefehldt (NASA Johnson Space Center)

For more information, contact Tom Burbine (tburbine@mtholyoke.edu)

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Homework due Friday (worth 2 points)

- How many moons does Jupiter have?
- How are Jupiter's moons named?
- What are the four biggest?
- What are the four biggest moon's diameters and density?
- What is interesting about each of Jupiter's four largest moon?
- Who discovered Jupiter's four largest moons and when?
- Who discovered the fifth largest moon of Jupiter and when?
- Who discovered the sixth largest moon of Jupiter and when?

Due Today

- Read Rolling Stone article
- Write down 3 reasons why it is difficult to go to Mars
- You will get 1 HW point

Rolling Stone Article

Basic Definition of Life

- Growth
- Metabolism
- Motion
- Reproduction
- Stimulus response

ALH 84001

- Allan Hills 84001
- Martian meteorite found in Antarctica
- Thought to have evidence for life (1996)

Meteorites from Mars

- Are called SNCs
- Shergottites, Nakhrites, Chassignites
 - Shergotty
 - Nakhla
 - Chassigny
- 34 Martian meteorites currently known



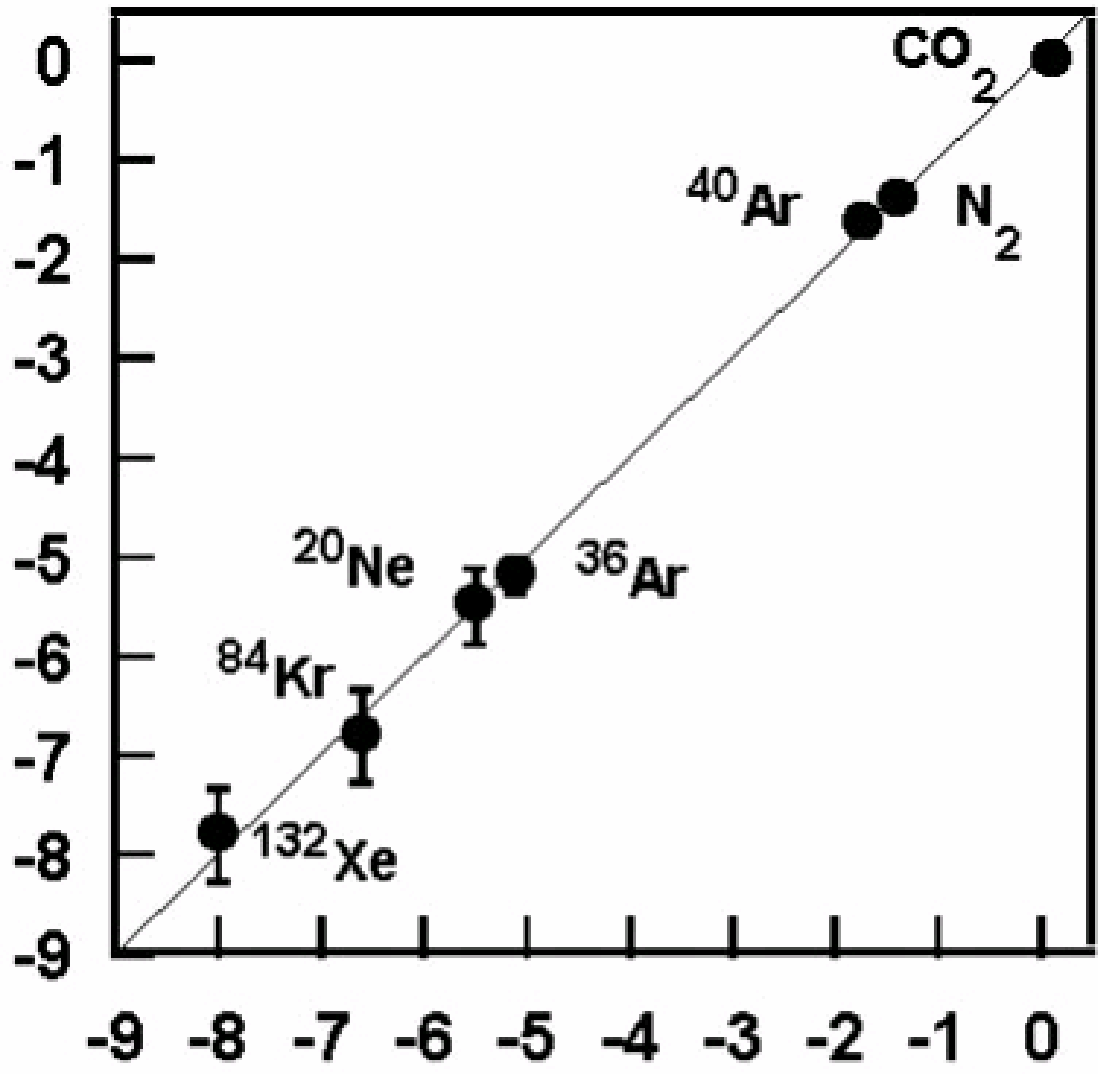
How do we know they are from Mars?

- Most have young crystallization ages (1.35 and 0.15 billion years)
- Gases in glass in meteorites match Mars

Crystallization Age

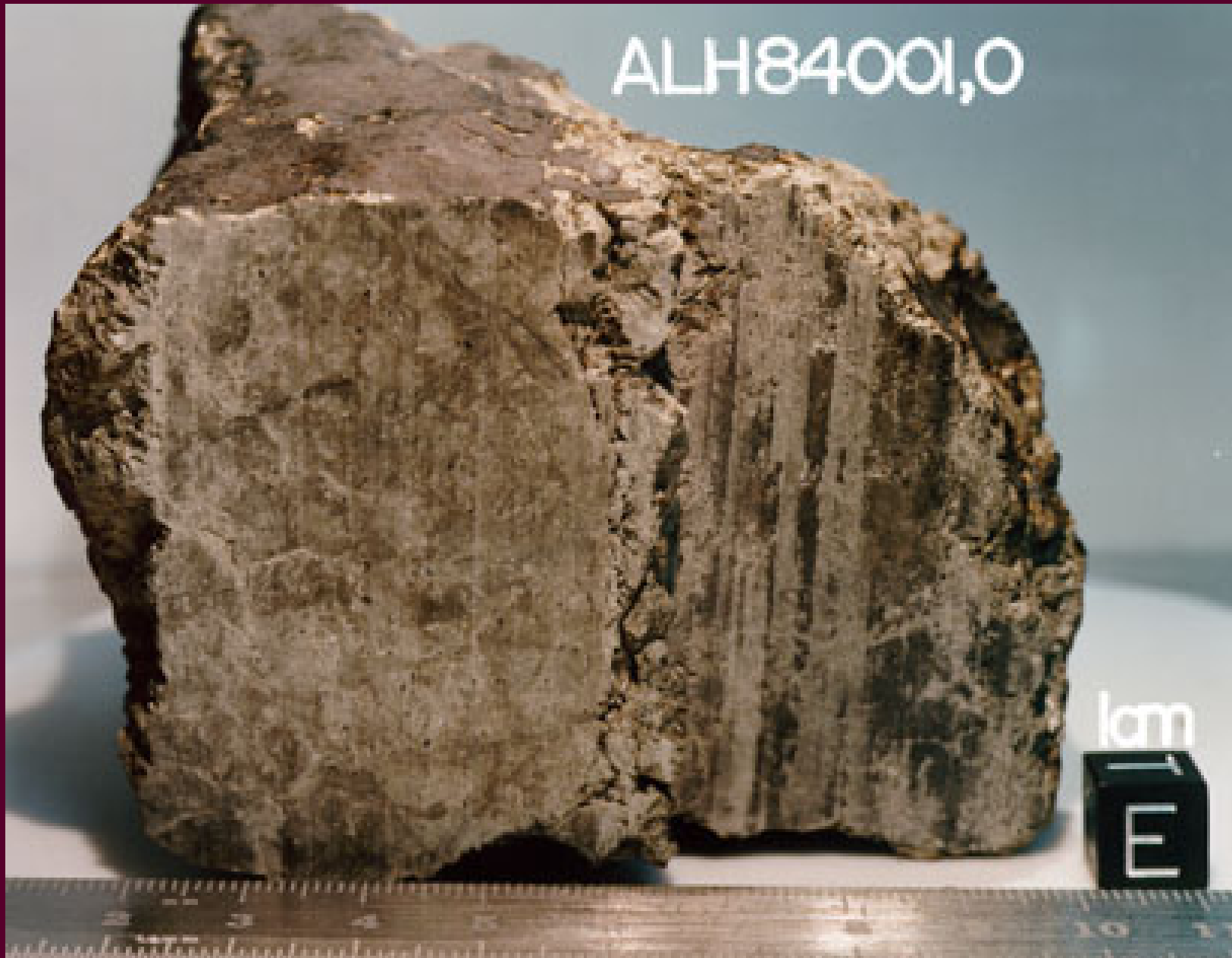
- Crystallization age is measured from when the rock cooled and the mineral formed
- Certain unstable isotopes are locked into the crystals of the rock, and they begin to decay.

log [fraction of Martian atmosphere]
from Viking Landers

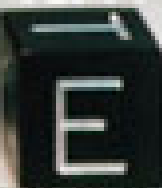


log [fraction of gas from EETA79001]

ALH84001,0



1cm



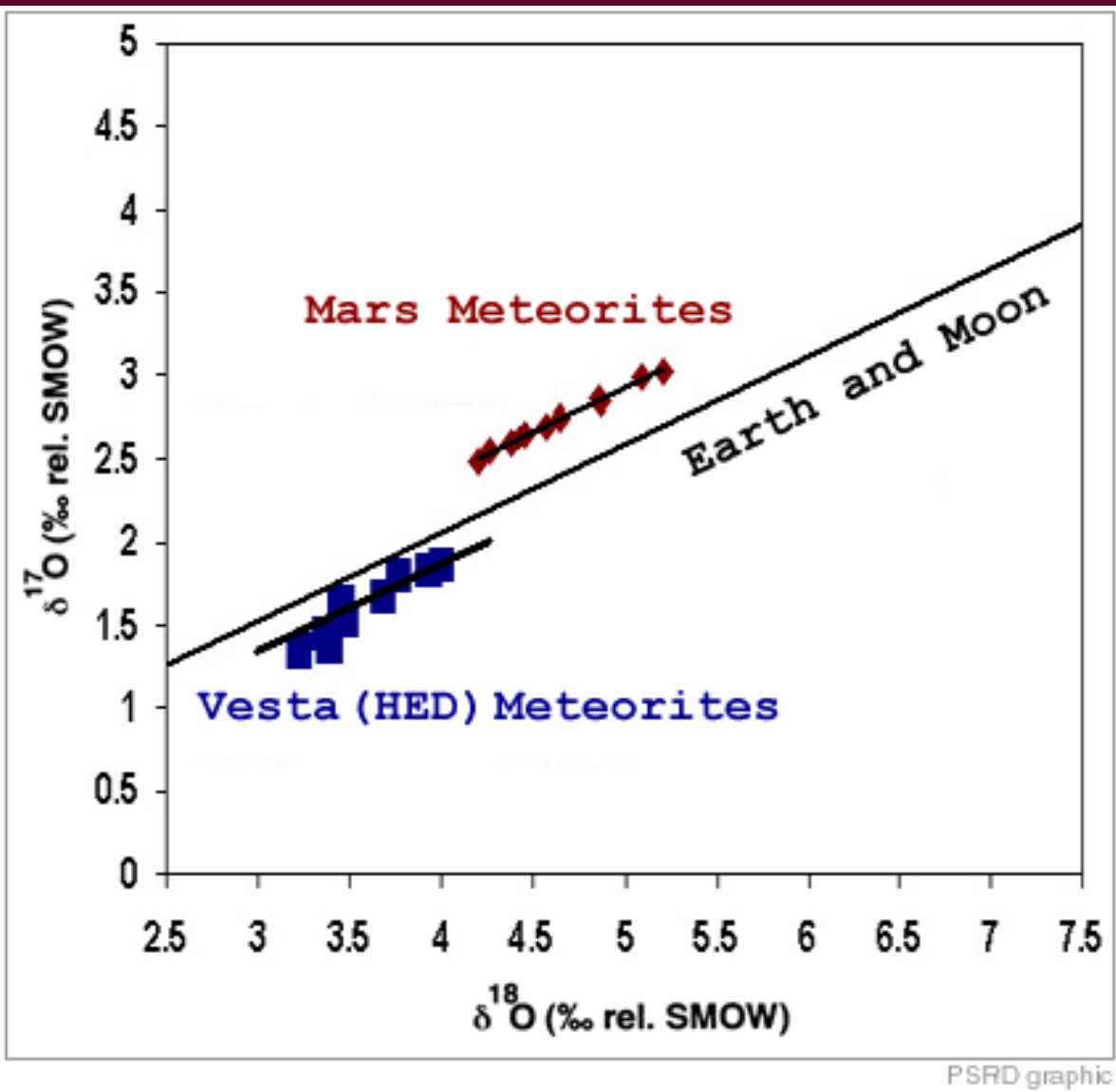
Evidence

- organic molecules
- Magnetite (Fe_3O_4) that looks like it formed from biologic activity
- nanofossil-like structures



Age of ALH 84001

- ALH 84001 - 4.5 billion years
- But has same oxygen isotope ratio as other Martian meteorites so it comes from Mars
- Oldest meteorites are 4.56 billion years



What are problems with studying Martian meteorites to learn about Mars

Any questions?