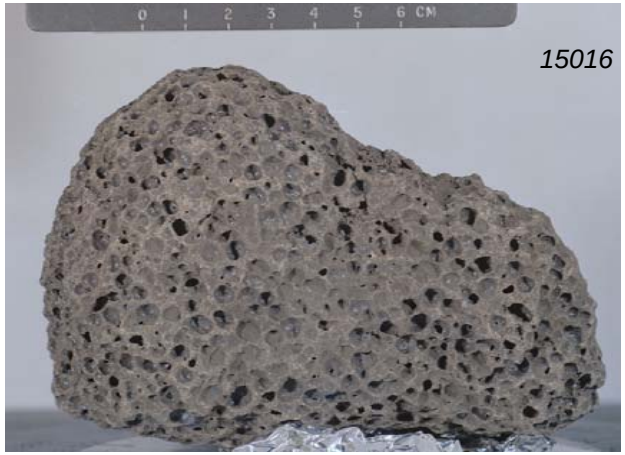
ANORTHOSITES

Basics:
- Igneous (Volcanic) rocks
- Contain minerals such as feldspar which are less dense than olivine and pyroxene
- These less dense minerals floated in a layer of molten rock (magma) forming an anorthosite crust.
- Age of anorthosites range from ~4.5 – 4.3 billion years old

Characteristics:
- Brighter/lighter in color than the mare basalts
- Very friable (easily breakable)
- Generally coarse grained (can see individual minerals)

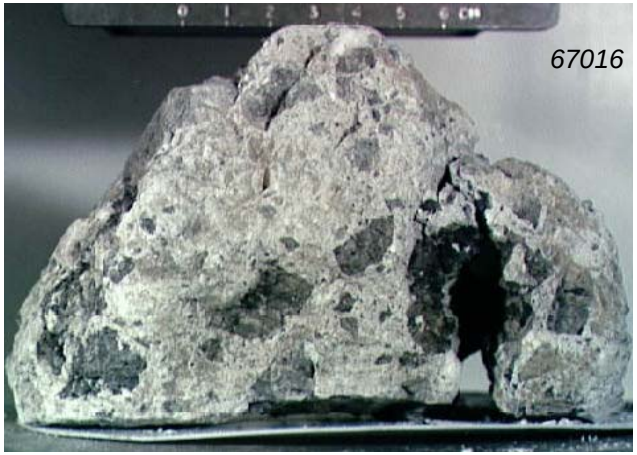
MARE BASALTS



Basics:
- Igneous (Volcanic) rocks
- Contain dense minerals such as olivine and pyroxene
- Mare basalts formed by remelting the dense materials that sank out of the magma ocean.
- Age of mare basalts range from ~3.9 – 3.2 billion years old

Characteristics:
- Dark gray to black in color
- Fine grained (you cannot easily see individual minerals that make up the rock)
- Usually include holes (vesicles) created by gases that escaped before magma solidified into rock
- Rough texture
- Hard surface

IMPACT BRECCIAS



Basics:
- Composite rocks made from a collection of rock and mineral fragments all mixed together
- Formed by impact events
- Heat and pressure from impact events caused different rock fragments to fuse together
- Vary in age

Characteristics:
- Mixture of both fine and coarse grains
- Combination of characteristics of basalts and anorthosites
- Appear to have fragments (clasts) that have been “cemented together” to form the rock

Lunar Magma Ocean Concept: When the Moon formed it was surrounded by a layer of molten rock (ocean of magma) hundreds of kilometers thick. As the magma crystallized, the minerals more dense than the magma sank while those less dense (such as feldspar) floated, forming the anorthosite crust. [This process is known as differentiation.] The dense minerals (olivine and pyroxene) later remelted to produce the basalts that compose the lunar maria.

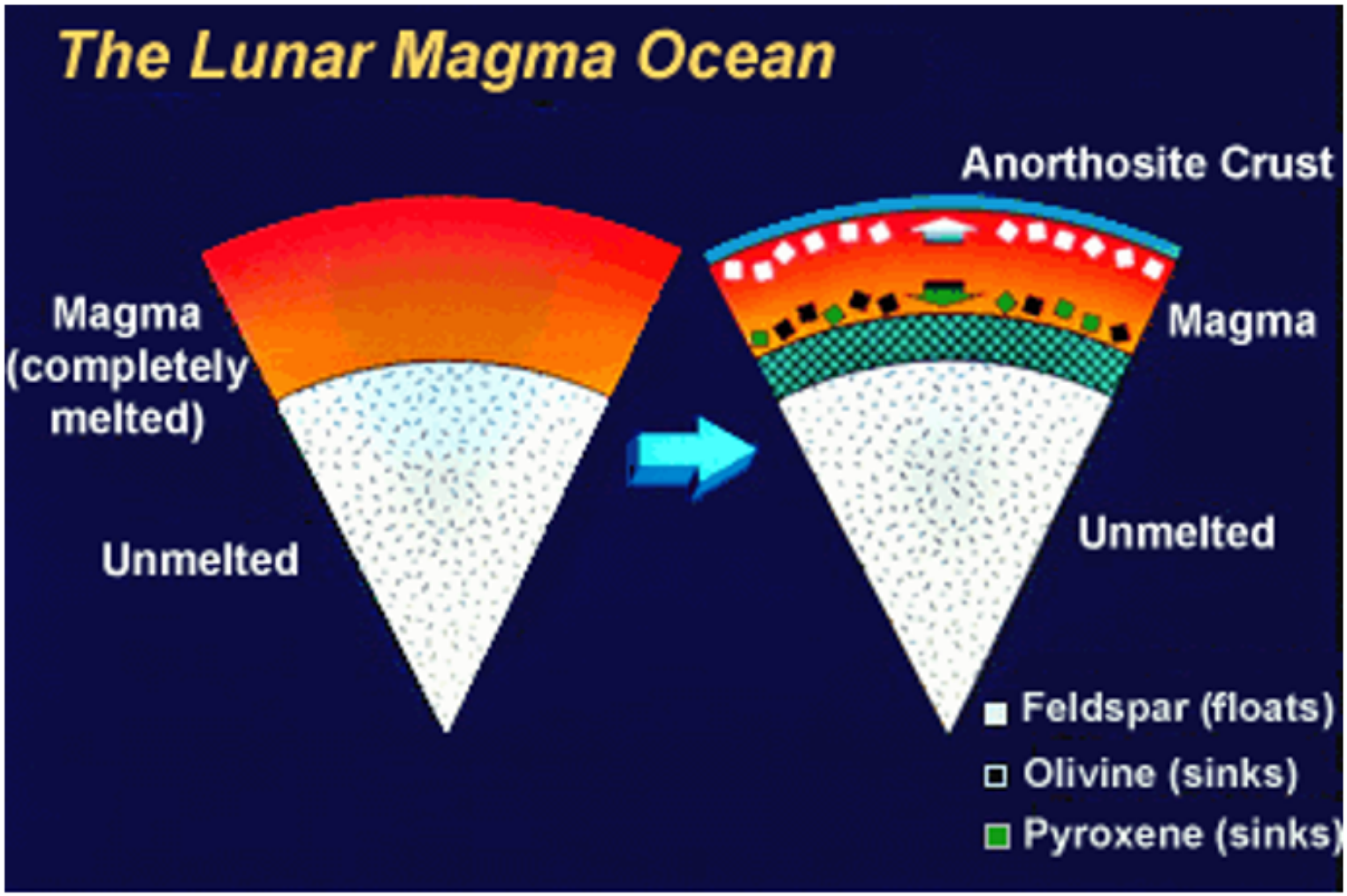


Image Credit: Brooks G. Bays Jr., PSRD graphic artist, University of Hawaii