Minerals

plagioclase feldspar

calcium-sodium alumino-silicate

* Samples returned by the Apollo 11 landing on the moon included some brecciated anorthosites. The landing area was on Mare Tranquilitatis, and the maria are known to be basaltic. The composition of lunar anorthosite plagioclase is very anorthitic (An94–99). The anorthosites contain abundant Si, Ca, and Al, with some Na and Fe, but little else. The low Na and K contents may reflect an early loss of alkalis in the moon. The anorthosites are also very old: 4.4 Ga.

CaAl2Si2O8—An

Al:Si -> 1:1

Ca:Si -> 1:2

Low values of Na

*Anorthite* exists only in an ordered state; Al and Si occupy alternate tetrahedra throughout the structure, consistent with the 1: 1 Al:Si ratio in *anorthite*

<https://dspmuranchi.ac.in/pdf/Blog/ANORTHOSITES.pdf>

<https://link.springer.com/referenceworkentry/10.1007/0-387-30720-6_104#:~:text=Composition,especially%20in%20soda%2Drich%20plagioclase.>

Pyroxene and its variants

magnesium-iron-calcium silicates

There are different kinds

Mg: Si -> lesser than 1, yet close like 0.8 (orthopyroxene -> actually found on the moon)

Ca:Si -> lesser than 1 (maybe 0.4754) (clinopyroxene**)**

* if Mg/Si < 1, Mg forms orthopyroxene (MgSiO3) and the remaining Si forms other minerals, such as feldspar (CaAl2Si2O8, NaAlSiO8) or olivine (Mg2SiO4);
* if 1 < Mg/Si < 2, Mg is distributed equally between pyroxene and olivine;
* if Mg/Si > 2, Si forms olivine and the remaining Mg forms other oxides like MgO.

<https://www.aanda.org/articles/aa/full_html/2018/06/aa30743-17/aa30743-17.html#:~:text=if%20Mg%2FSi%20%3C%201%2C,forms%20other%20oxides%20like%20MgO.>

<https://hal.science/hal-00908774/file/34da5a3fc0d8ba15e6d61feadb509ee15e21.pdf>

Olivine

magnesium- iron

Mg: Si -> 1.85 +- 0.1 (some kinds)

<https://sccs.stanford.edu/sites/g/files/sbiybj17761/files/media/file/1-s2.0-s000925411400117x-main_0.pdf>

Ilmenite

titanium-iron

Ti: Fe -> 0.67 to 0.91

<https://etasr.com/index.php/ETASR/article/view/6025#:~:text=The%20Ti/(Ti+Fe)%20ratio%20ranges%20between%200.51%20and,the%20chemical%20formula%20of%20ilmenite%20is%20Fe3Ti3O9>