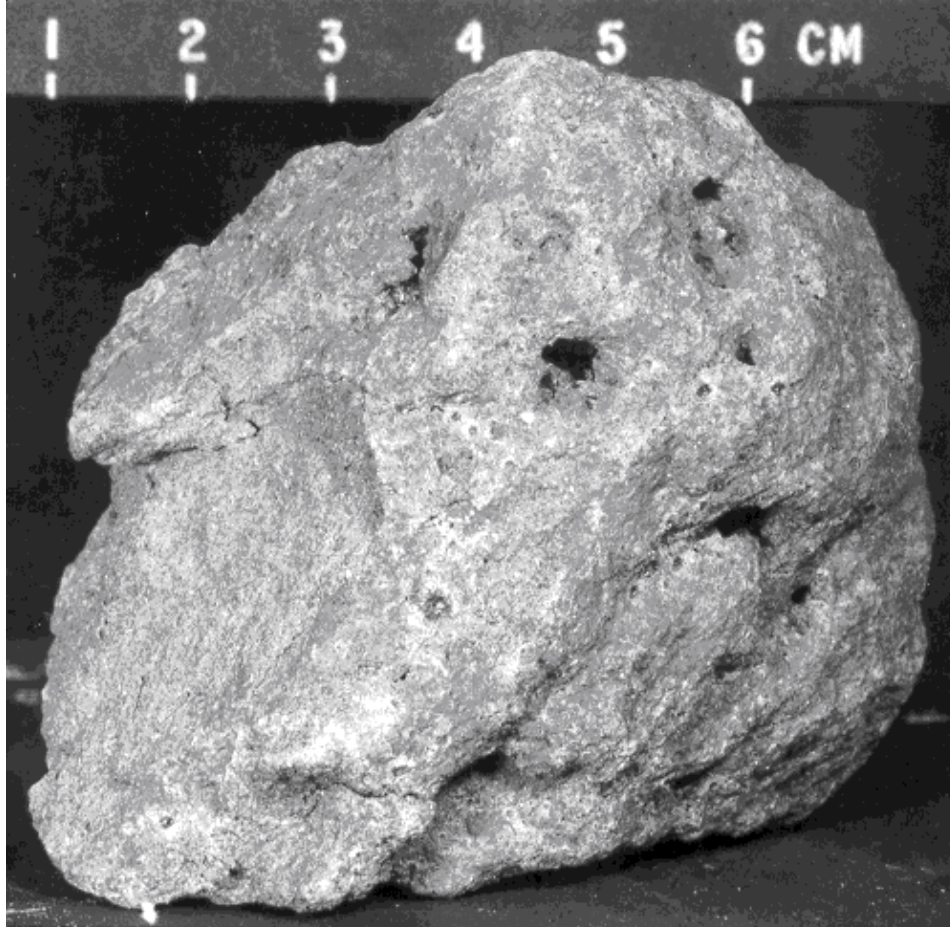


**12006**  
Olivine Basalt  
206.4 grams



*Figure 1: Photo of 12006. Note cavities (vugs) and zap pits. NASA #S69-62339. Scale is shown.*

### **Introduction**

James and Wright (1972) originally classified 12006 as a “subophitic feldspathic basalt”, while Rhodes et al. (1977) and Neal et al. (1994) termed it an “olivine basalt” based on its chemical composition.

According to Hörz and Hartung (1971), rock 12006 displayed various micrometeorite crater densities on all surfaces, indicating multiple orientations during its history on the lunar surface. This basalt also has several cavities or “vugs” (figure 1).

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### **Mineralogical Mode for 12006**

	Neal et al. 1994
Olivine	22.6
Pyroxene	28.7
Plagioclase	43.4
Ilmenite	1.1
Chromite +Usp	3.4
Mesostasis	0.5

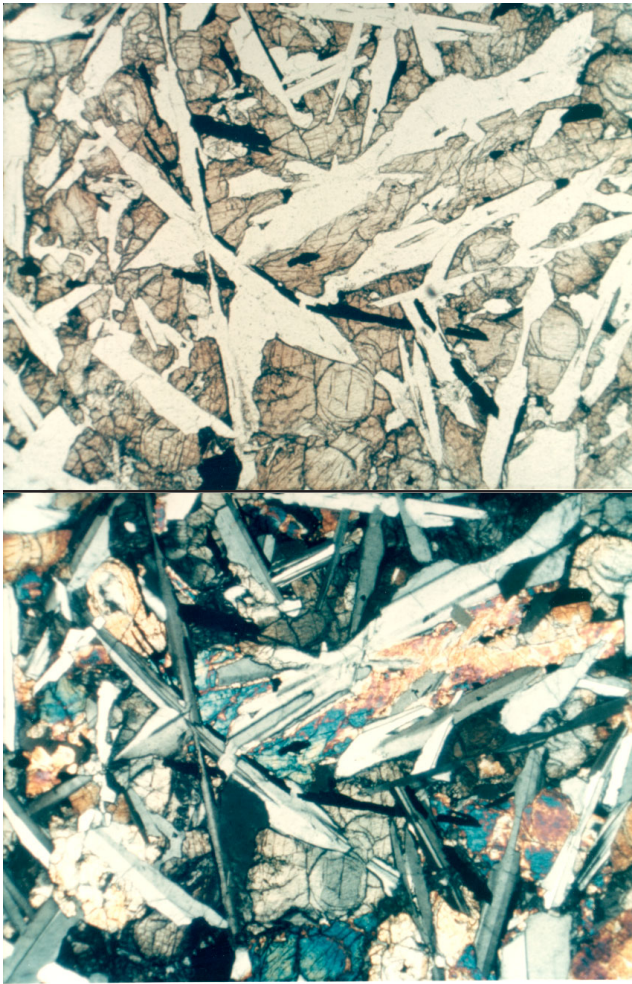


Figure 2: Texture of lunar basalt 12006. Photomicrographs S70-16788-789. Field of view is 2.2 mm. Lower photo is with crossed-nicols.

### **Petrography**

For some reason, 12006 has not been well studied (although there are several thin sections). The texture is that of a medium-grained subophitic basalt (figure 2). According to Neal et al. (1994), this basalt has a high proportion of plagioclase (43%).

### **Chemistry**

The REE content determined by Neal et al. (1994) did not agree with that of Rhodes et al. (1977) (table 1, figure 3). Neal et al. also found relatively high Na<sub>2</sub>O.

### **Radiogenic age dating**

This sample has not been dated (although it was allocated to Wasserburg).

The main mass, 12006,1 is on public display in Japan (figure 5).

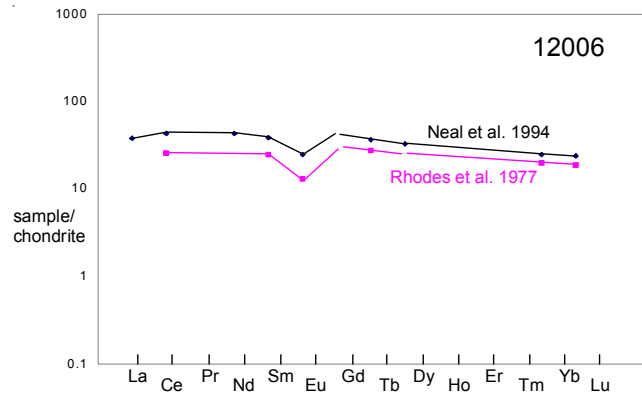


Figure 3: Normalized rare-earth-element diagram for 12006.

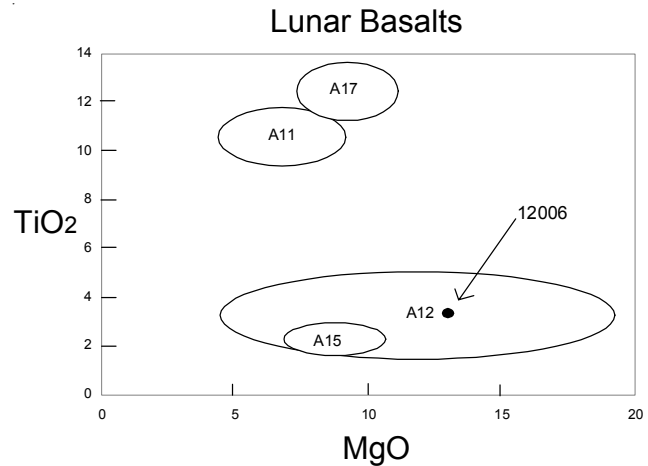


Figure 4: Composition of 12006 compared with other lunar basalts.

### **List of Photo #s**

- S70-16788-789 TS
- S70-49155-158 TS
- S70-49957-958 TS
- S76-27137-143 color mug
- S86-38616-618
- S90-33265-266

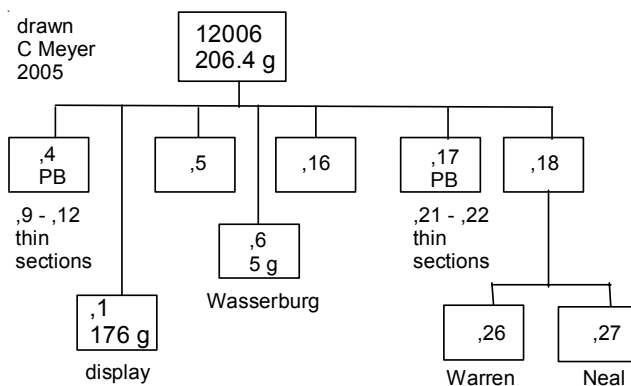
**Table 1. Chemical composition of 12006.**

reference weight	Neal 94	Rhodes77	
SiO <sub>2</sub> %	.238 g	44.23	(c)
TiO <sub>2</sub>	3.2	(a) 2.59	(c)
Al <sub>2</sub> O <sub>3</sub>	10.6	(a) 7.67	(c)
FeO	20.8	(a) 20.94	(c)
MnO	0.258	(a) 0.29	(c)
MgO	12.8	(a) 14.67	(c)
CaO	9.8	(a) 8.13	(c)
Na <sub>2</sub> O	0.409	(a) 0.2	(a)
K <sub>2</sub> O	0.075	(a) 0.05	(c)
P <sub>2</sub> O <sub>5</sub>		0.05	(c)
S %		0.06	(c)
sum			
Sc ppm	47.2	(a) 40.1	(a)
V	172	(a)	
Cr	3890	(a) 6250	(a)
Co	45.2	(a) 60	(a)
Ni	70	(a) 110	(a)
Cu			
Zn			
Ga			
Ge ppb			
As			
Se			
Rb			
Sr	104	(a) 89	(c)
Y		31	(c)
Zr		97	(c)
Nb		6.4	(c)
Mo			
Ru			
Rh			
Pd ppb			
Ag ppb			
Cd ppb			
In ppb			
Sn ppb			
Sb ppb			
Te ppb			
Cs ppm			
Ba	117	(a) 56	(b)
La	9	(a)	
Ce	26.3	(a) 15.7	(a)
Pr			
Nd	19.6	(a)	
Sm	5.7	(a) 3.77	(a)
Eu	1.42	(a) 0.72	(a)
Gd			
Tb	1.35	(a) 1.02	(a)
Dy	8.1	(a)	
Ho			
Er			
Tm			
Yb	4.1	(a) 3.3	(a)
Lu	0.59	(a) 0.47	(a)
Hf	3.8	(a) 3	(a)
Ta	0.56	(a)	
W ppb			
Re ppb			
Os ppb			
Ir ppb			
Pt ppb			
Au ppb			
Th ppm	0.74	(a)	
U ppm			

technique (a) INAA, (b) IDMS, (c) XRF



Figure 5: 12006,1 in display mounting on loan to Japan. NASA photo # S90-33266.



## References for 12006

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