

14168,33

Coarse-grained Basalt

0.94 grams



Figure 1: Thin section of 14168,33 (Warner et al. 1980).

Introduction

14168 is a collection of coarse-fines (4-10 mm) from the bag (1027) that held the football-sized rocks (14303-14305) and smaller rocks apparently derived from the breakup of the larger samples (14169-14188). A small amount of soil was also placed in this bag (14165). Most of the coarse-fine particles were probably derived from these breccia samples.

One of the particles (,33) was found to be a rare basalt (Kramer and Twedell 1977). It has been dated by Shih et al. (1986) at about 3.9 b.y.

Petrography

Warner et al. (1980) described 14168,33 as a high-K mare basalt with abundant small grains of K-feldspar (figure 1). Pyroxenes are typical of mare basalt (figure 2). Accessory minerals include olivine, chromite, metal and troilite.

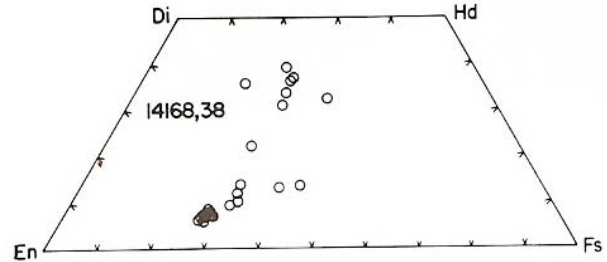
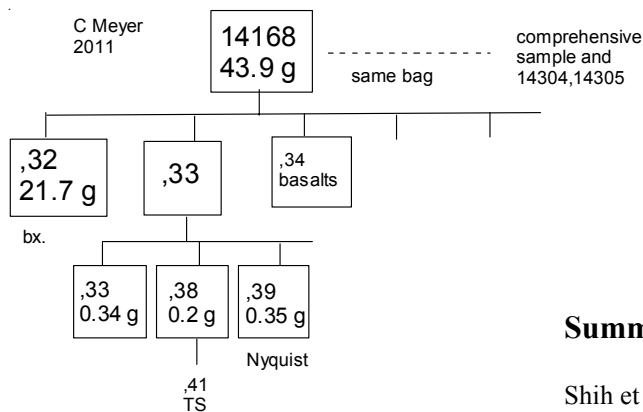


Figure 2: Composition of pyroxene in 14168,33 (Warner et al. 1990).

Chemistry

14168,33 has low Ti, high Al, high K and a slightly bow-shaped REE pattern.

Radiogenic age dating

Shih et al. (1986) determined the age of this fragment (figure 3).

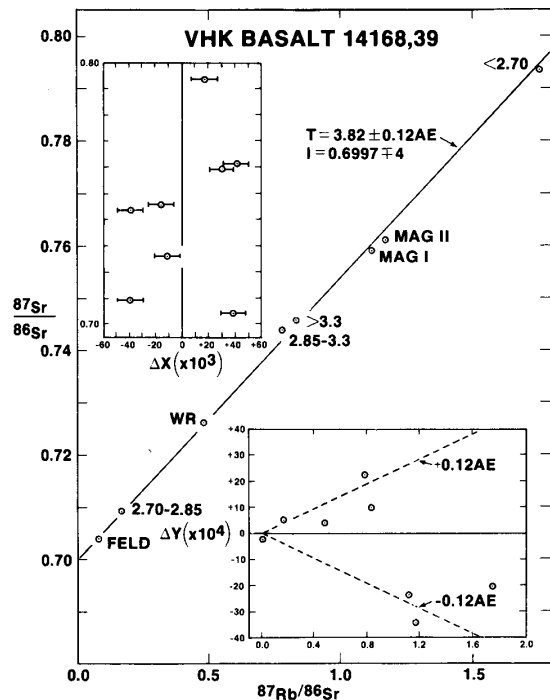


Figure 3: Rb/Sr isochron for VHK basalt 14168,39 (Shih et al. 1986).

Summary of Age Data for 14168,39

	Rb/Sr	Ar/Ar	Sm/Nd
Shih et al. 1986	3.82 ± 0.12 b.y.	3.85 ± 0.05 b.y.	3.91 ± 0.16 b.y.

Table 1. Chemical composition of 14168,33.

reference weight	Warner80 mare clast	Shervais90 Shih 86
SiO ₂ %		47.8
TiO ₂	1.7 (a)	1.7
Al ₂ O ₃	12.4 (a)	12.4
FeO	15.5 (a)	15.5
MnO	0.215 (a)	etc
MgO	11 (a)	
CaO	9.9 (a)	
Na ₂ O	0.366 (a)	
K ₂ O	0.57 (a)	
P ₂ O ₅		
S %		
sum		
Sc ppm	52 (a)	
V	139 (a)	
Cr	3722 (a)	
Co	31 (a)	
Ni	40 (a)	
Cu		
Zn		
Ga		
Ge ppb		
As		
Se		
Rb		9.76 (b)
Sr		58.8 (b)
Y		
Zr	80 (a)	
Nb		
Mo		
Ru		
Rh		
Pd ppb		
Ag ppb		
Cd ppb		
In ppb		
Sn ppb		
Sb ppb		
Te ppb		
Cs ppm		
Ba	100 (a)	
La	5.2 (a)	
Ce	14 (a)	
Pr		
Nd	11 (a)	
Sm	3.4 (a)	
Eu	0.71 (a)	
Gd		
Tb	0.8 (a)	
Dy	5.4 (a)	
Ho		
Er		
Tm		
Yb	3.6 (a)	
Lu	0.53 (a)	
Hf	2.4 (a)	
Ta	0.6 (a)	
W ppb		
Re ppb		
Os ppb		
Ir ppb		
Pt ppb		
Au ppb		
Th ppm	0.7 (a)	
U ppm		
technique:	(a) INAA, (b) IDMS	

References for 14168

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