# 70145

## High-Ti Mare Basalt
## 3.07 g, 2 x 1 x 1 cm

### INTRODUCTION

70145 (Fig. 1) was described as a medium gray, equigranular, high-Ti mare basalt, containing ~5% miarolitic cavities lined with plagioclase, pyroxene, and ilmenite (Apollo 17 Lunar Sample Information Catalog, 1973). No zap pits are present. This sample was collected from the "Geophone Rock", 50 m south of the ALSEP central station.

### PETROGRAPHY AND MINERAL CHEMISTRY

Neal et al. (1989) described 70145 as a plagioclase-poikilitic high-Ti basalt. Anhedral, blocky ilmenites (0.1-1.1 mm) form an intersertal texture with pyroxene (0.1-0.9 mm) and plagioclase (0.2-4.2 mm). Ilmenite contains chromite and rutile exsolution lamellae (< 0.005 mm). Rare discrete chromite-ulvospinels are present (-0.2 mm). Olivine may be found in cores of pyroxenes or as discrete grains (~0.1 mm) in plagioclase. Armalcolite is found without ilmenite rims and enclosed in plagioclase. Native Fe and troilite form interstitial phases. Modal analysis resulted in: 42.7% pyroxene; 32.5% plagioclase; 20.6% ilmenite; 2.5% armalcolite; 2% olivine; 1.3% native Fe and troilite; and 1%chromite-ulv6spinel. Rutile is present only in trace amounts.

Individual olivine grains are typically unzoned, but compositions vary between grains ($Fo_{60.73}$). Plagioclase exhibits little zonation ($An_{S5.92}$), but the rims are usually more sodic. Pyroxenes vary in composition from pigeonite to titan-augite, with no evidence of Fe enrichment (Fig. 2). $Cr_2O_3$ contents decrease with decreasing pyroxene MG#, and Al/Ti ratios have a constant value of ~2. Spinel grains are zoned (core-to-rim) from chromite to more ulvospinel-rich compositions. Cr/(Cr+Al) ratios vary from 68-83 and MG# from 13 to 26. Ilmenite exhibits a greater variation in MG# (10-26) than does armalcolite (42-48).

### WHOLE-ROCK CHEMISTRY

Neal et al. (1990) described basalt 70145 as a Type A variant (Table 1) using the classification of Rhodes et al. (1976) and Warner et al. (1979). The REE profile is LREE-depleted and convex-upwards (Fig. 3). The MREE values reach -50 times chondritic values. A negative Eu anomaly is present ($[Eu/Eu^*]_N = 0.56$). Neal et al. (1990) have used the whole-rock composition of 70145, 4 to refine previous petrogenetic models and formulate a new one for the Type A Apollo 17 high-Ti basalts.

### PROCESSING

Of the original 3.07 g, approximately 2.49 g of 70145,0 remains; 0.573 g was irradiated for INA analysis, and a thin section, 70145,3, required 0.01 g.

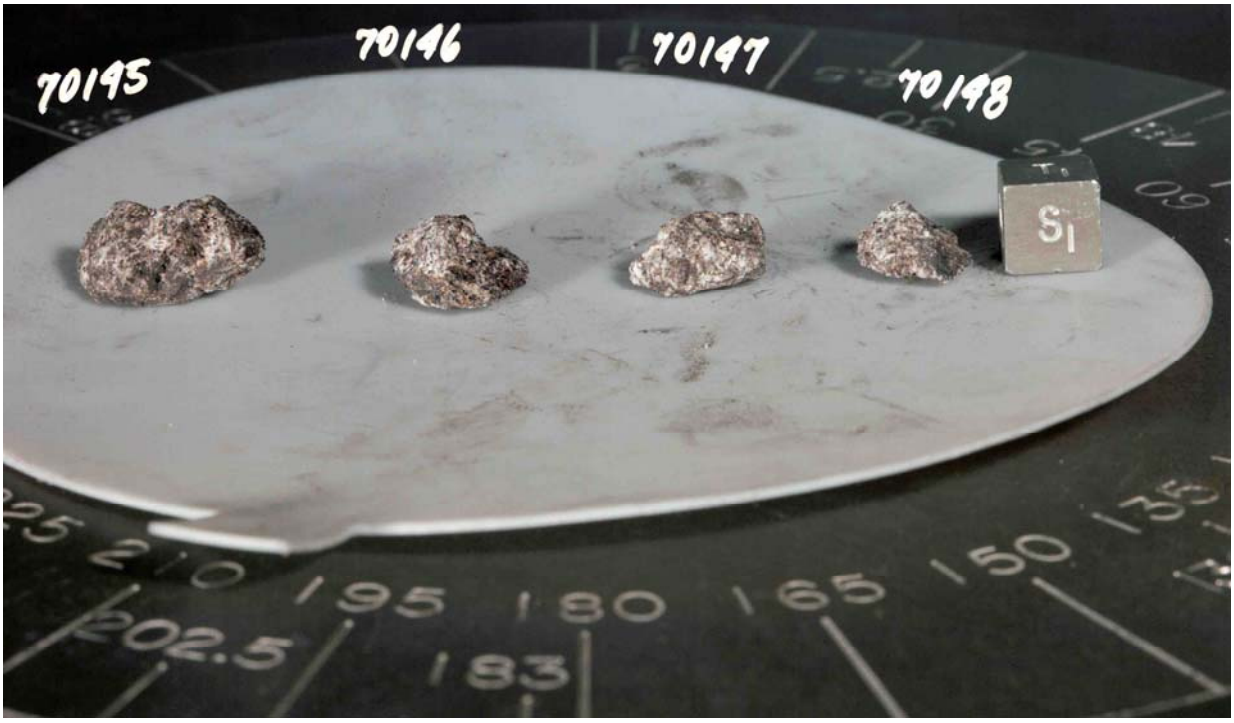


Figure 1: Hand specimen photograph of 70145, 70146, 70147, and 70148.

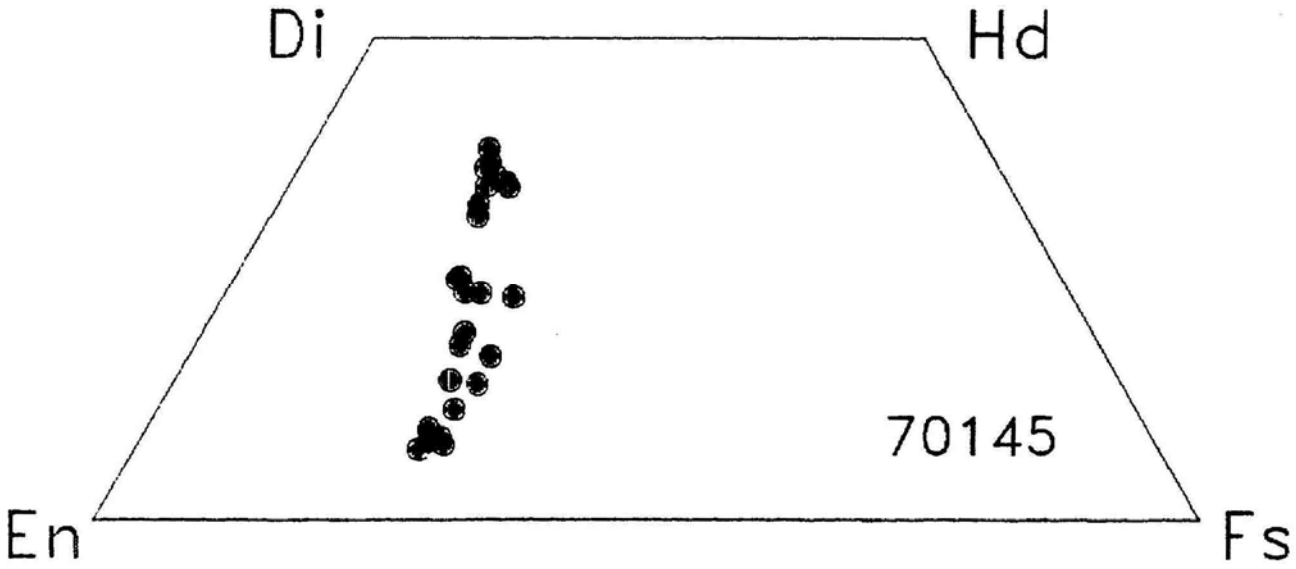


Figure 2; Pyroxene compositions of 70145 represented on a pyroxene quadrilateral.

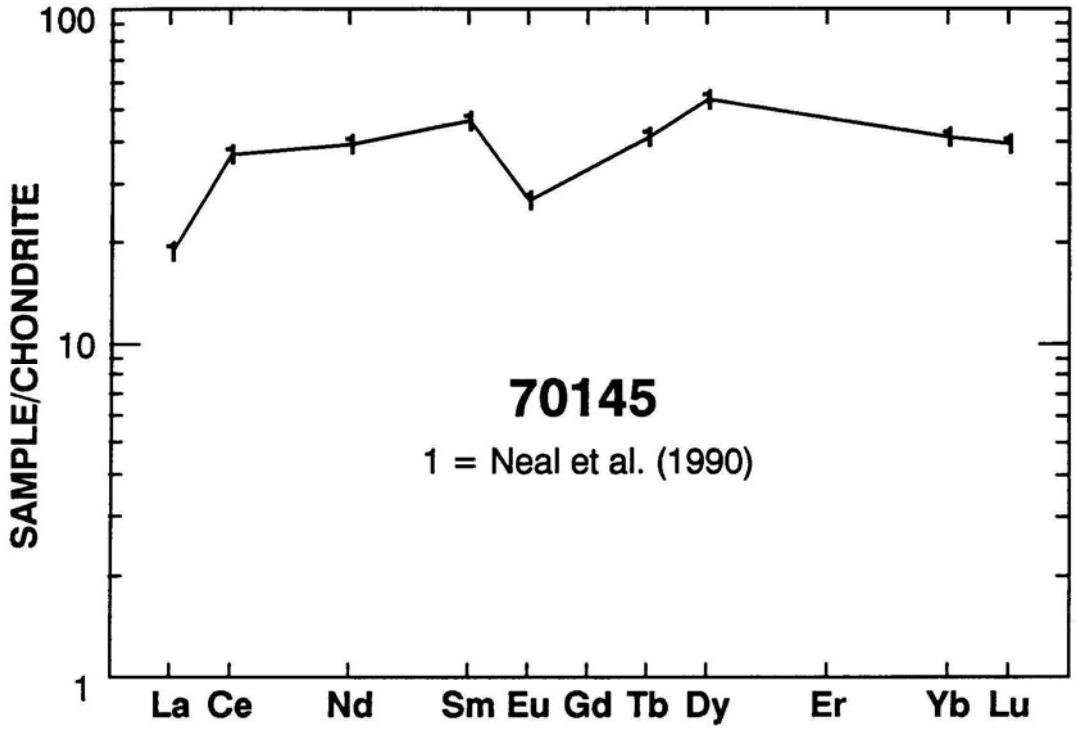


Figure 3: Chondrite -normalized rare-earth element profile of 70145.

**Table 1: Whole-rock composition of 70145,4.**
Data from Neal et al. (1990).

| | 70145,4 | | 70145,4 |
|---|---|---|---|
| $SiO_2$ (wt%) | | Cu | |
| $TiO_2$ | 13.5 | Ni | 19 |
| $Al_2O_3$ | 7.76 | Co | 18.4 |
| $Cr_2O_3$ | 0.503 | V | 130 |
| FeO | 19.0 | Sc | 82 |
| MnO | 0.256 | La | 6.24 |
| MgO | 8.5 | Ce | 32 |
| CaO | 9.2 | Nd | 25 |
| $Na_2O$ | 0.36 | Sm | 9.46 |
| $K_2O$ | 0.08 | Eu | 2.08 |
| $P_2O_5$ | | Gd | |
| S | | Tb | 2.42 |
| Nb (ppm) | | Dy | 18.5 |
| Zr | 180 | Er | |
| Hf | 8.72 | Yb | 9.17 |
| Ta | 1.69 | Lu | 1.35 |
| U | 0.48 | Ga | |
| Th | 0.25 | F | |
| W | | Cl | |
| Y | | C | |
| Sr | 240 | N | |
| Rb | | H | |
| Li | | He | |
| Ba | 103 | Ge (ppb) | |
| Cs | 0.11 | Ir | |
| Be | | Au | |
| Zn | | Ru | |
| Pb | | Os | |

Analysis by INAA.