

**77539****Poikilitic Impact Melt Breccia  
39.6 g, 5 x 3 x 2 cm****INTRODUCTION**

Sample 77539 is a rake sample from soil 77530 at Station 7 (Fig. 1). It is a vesicular impact melt breccia that is similar in texture to the matrix of boulder sample 77135. Sample 77539 contains a quasi-pristine "anorthosite" clast (Warren, 1993).

**PETROGRAPHY**

The texture of 77539 is poikiloblastic, with irregular pigeonite oikocrysts enclosing abundant euhedral plagioclase laths and tablets and minor rounded olivine grains (Fig. 2). Ilmenite is also poikilitic. Mineral clasts are abundant (mostly plagioclase), but lithic clasts are rare. Warner et al. (1977) give the mineral mode of the matrix of 77539 as 50.8% plagioclase, 45.2% pyroxene, and 2.2% ilmenite.

**MINERAL CHEMISTRY**

The compositions of minerals in 77539 are given in Fig. 3 (Warner et al., 1978). Engelhardt (1979) has studied the ilmenite in 77539.

**WHOLE-ROCK CHEMISTRY**

Laul and Schmitt (1975c) have reported the composition of 77539 (Table 1 and Fig. 4). The analysis of Laul and Schmitt indicates that their piece had an excess of plagioclase. Warner et al. (1977) analyzed the matrix by broad-beam electron probe analyses and reported a composition more typical of impact melts (Table 1).

**SIGNIFICANT CLASTS**

Keil et al. (1974) reported that 77539 contained a large white clast (30% of sample?) that is very fine sugary material with patches of "yellow-green" mineral up to 2 mm. Warren et al. (1991) found that this clast is a pristine "anorthosite." This clast is reported as having an extremely fine-grained granulitic texture. A bulk analysis of this clast is given in Table 1. Warren (1993) reports that this clast is ~99% plagioclase ( $An_{94.5-96.3}$ ), and ~1% olivine ( $FO_{72}$ ) and pyroxene ( $Wo_9En_{64}Fs_{27}$ ). Metal grains found included in this clast are low in Ni and Co. Although this clast has very low Ir, Warren (1993) lists it as only "quasipristine."

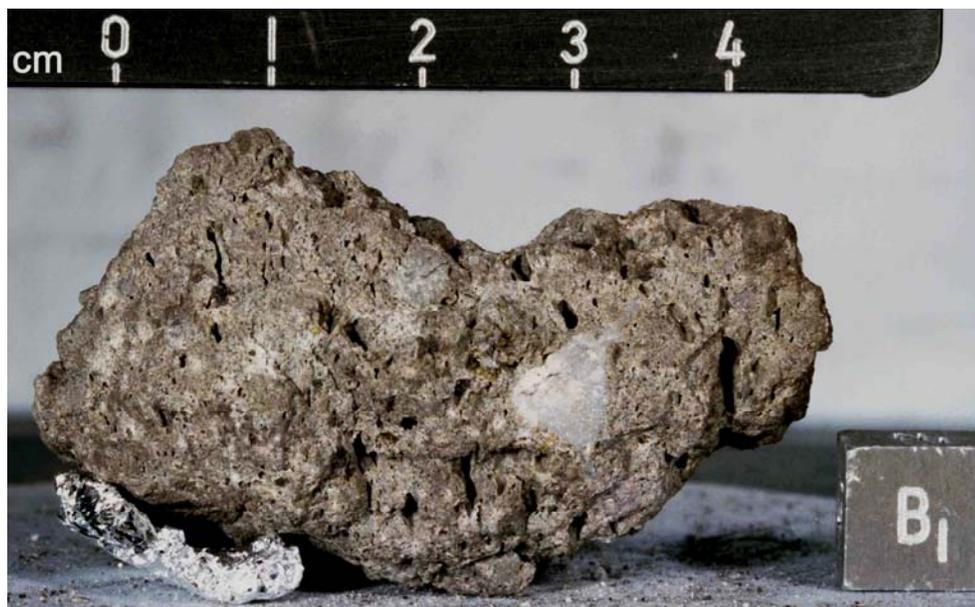


Figure 1: Photograph of 77539. Cube is 1 cm. S73-19062.

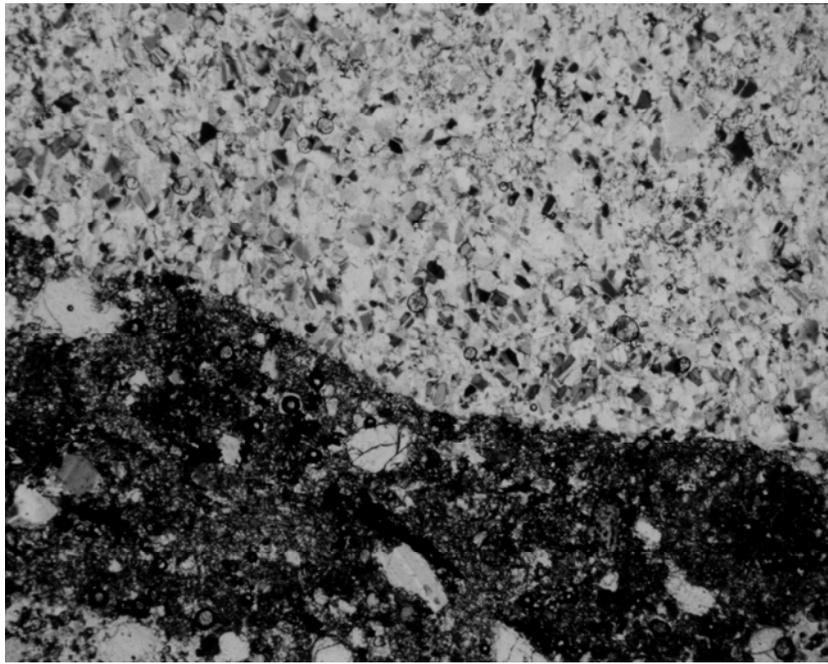


Figure 2: Photomicrograph (partially crossed polarizers) of thin section 77539,13, showing poikiloblastic matrix and part of a large clast (6 mm) of shocked and recrystallized anorthite. Field of view is 3 x 4 mm.

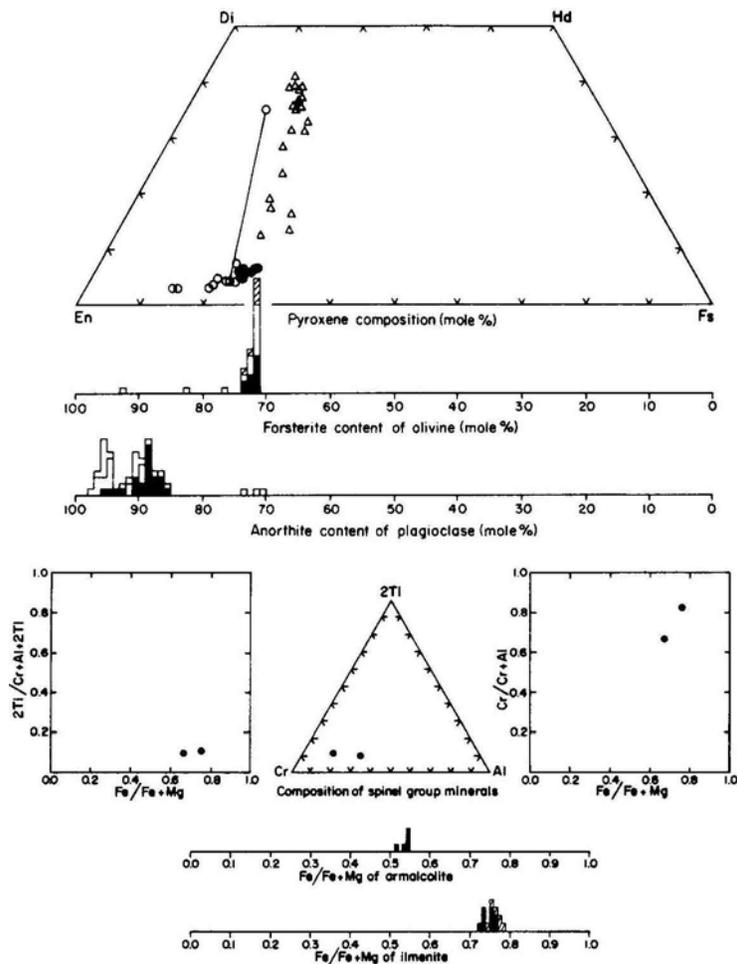


Figure 3: Compositions of minerals from 77539. From Warner et al. (1978).

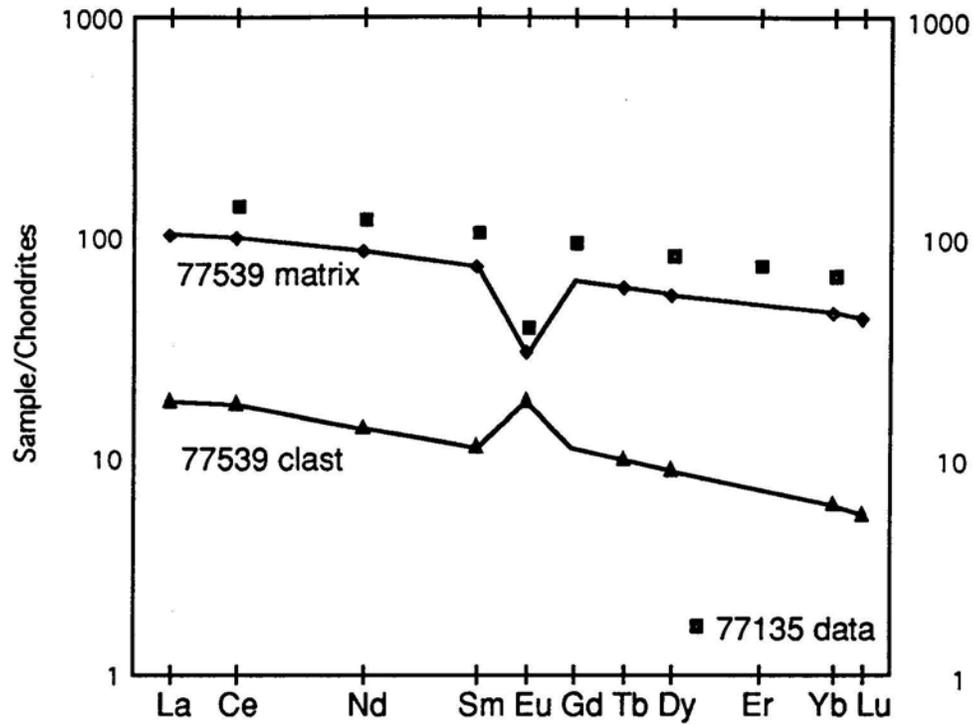


Figure 4. Normalized rare earth element diagram for 77539 matrix and "anorthosite clast" compared with data from 77135. Data from Laul and Schmitt (1975) and Warren (1991).

**Table 1: Whole-rock chemistry of 77539.**

a) Laul and Schmitt (1975); b) Warner et al. (1977); c) Warren et al. (1991)

<b>Split Technique</b>	<b>,8 (a) INAA</b>	<b>matrix (b) BB e-probe matrix</b>	<b>,15 (c) INAA clast</b>
SiO <sub>2</sub> (wt%)	–	48.1	44.08
TiO <sub>2</sub>	1.1	0.84	0.11
Al <sub>2</sub> O <sub>3</sub>	22	17.7	34.2
Cr <sub>2</sub> O <sub>3</sub>	0.136	0.16	0.02
FeO	6.9	7.8	0.67
MnO	0.082	0.11	0.012
MgO	8	11.3	0.896
CaO	12.5	11.1	18.9
Na <sub>2</sub> O	0.56	0.73	0.45
K <sub>2</sub> O	0.2	0.27	0.047
Nb (ppm)			
Zr	300		46
Hf	8.4		0.94
Ta	1.1		0.106
U	1.2		0.161
Th	3.2		0.62
Ba	240		57
Ni	300		3.0
Co	28		1.18
Sc	11		2.58
La	23.5		4.2
Ce	58		10.4
Nd	38		6.1
Sm	10.5		1.65
Eu	1.65		0.99
Gd			
Tb	2.1		0.35
Dy	13		2.12
Er			
Yb	7.1		0.99
Lu	1		0.132
Ge (ppb)			16
Ir	7		0.012
Au	2		0.028