

PETROLOGY OF THE PALO BLANCO CREEK EUCRITE; T. Dickinson, K. Keil, L. LaPaz, Dept. of Geology, Institute of Meteoritics, Univ. of New Mexico, Albuquerque, New Mexico 87131; R. A. Schmitt, M. R. Smith, Dept. of Chemistry and Radiation Center, Oregon State Univ., Corvallis, Oregon 97331; M. Rhodes, Dept. of Geology, Univ. of Massachusetts, Amherst, Massachusetts 01003.

The Palo Blanco Creek meteorite, a single stone weighing 1,482g, was found in 1954 by Mrs. Lincoln LaPaz in Colfax County, New Mexico (36°32'N, 104°4'W) and was donated by her to the Institute of Meteoritics in 1982. It was classified as a monomict pyroxene-plagioclase achondrite (eucrite) by (1) but was not previously studied in detail.

The meteorite is very fresh and has well-preserved fusion crust over much of its surface. The rock consists of light-colored, angular to rounded clasts, submillimeter to 4.5 cm in size, that are surrounded and occasionally cut by black shock veins. The clasts are subophitic in texture and consist of about 60% pyroxene (ferrohypersthene, avg. En_{35.7}Fo_{61.0}Wo_{3.4}, with exsolution lamellae of augite, avg. En_{30.4}Fs_{29.9}Wo_{39.7}, 4-24 μ m in width), 30% plagioclase (An₈₃₋₉₂), and 10% accessory phases including ilmenite, chromite, troilite, and very minor-shock produced glass veinlets. Plagioclase occurs as subhedral laths; adjacent to the shock veins, it often forms spherulites. Both plagioclase types have identical compositional ranges. The black shock veins consist of shock-produced mafic glass, ilmenite, chromite and metallic Ni-Fe and, in places, contain relict mafics.

Whole rock oxygen isotope ratios of $\delta O^{18} = 3.74$ and $\delta O^{17} = 1.73$ (R.N. Clayton, pers. comm.), mineral compositions and abundances, and bulk composition (Table 1) confirm that Palo Blanco Creek is a typical non-cumulate eucrite. Textural observations and similar bulk compositions of clasts and shock veins suggest that the rock is a basaltic eucrite whose monomict-brecciated appearance is the result of in situ shock blackening.

Table 1. Bulk compositions of shock veins and clasts in Palo Blanco Creek

	Shock veins*	Clast**	Clast***
SiO ₂ (wt.%)	n.d.	n.d.	48.74
TiO ₂	0.7	0.8	0.56
Al ₂ O ₃	13.3	14.6	13.16
Cr ₂ O ₃	0.28	0.27	n.d.
FeO	18.0	17.4	18.42
MnO	0.51	0.53	0.58
MgO	6.1	6.2	6.56
CaO	10.5	10.7	10.43
Na ₂ O	0.43	0.42	0.25
K ₂ O	0.06	0.06	0.064
P ₂ O ₅	n.d.	n.d.	0.090
Sc (ppm)	30	28	
V	66	70	
Co	4.1	2.9	
La	2.9	2.8	
Sm	1.76	1.78	
Eu	0.64	0.55	
Tb	0.42	0.38	
Dy	2.9	3.4	
Yb	1.69	1.63	
Lu	0.29	0.24	
Hf	1.2	1.1	

*Avg. of four samples, total weight 505 mg; INAA. ** Weight 511 mg; INAA.

*** Weight 3.93 g; XRF. n.d. = not determined.

(1) Mason, B., Smiths. Contr. Earth Sci. 14, 71-83, 1975.