A "MESOSIDERITE" ROCK FROM PUTORANA, RUSSIA: NOT A METEORITE?. A.H. Treiman[1], D.J. Lindstrom[2], C.S. Schwandt[4], R.N. Clayton[3], and M.L. Morgan[5]. [1]Lunar and Planetary Institute, 3600 Bay Area Boulevard, Houston TX 77058 <treiman@lpi.usra.edu>. [2]SN2, NASA Johnson Space Center, Houston TX 77058 <david.j.lindstrom1@jsc.nasa.gov>. [3]Lockheed Martin, Houston TX 77058.[4]Department Geophysical Sciences, University of Chicago, IL 60637. [5]Mile-High Meteorites, P.O. Box 151293, Lakewood, CO 80215 <mmorgan@mhmeteorites.com>.

We examined a possible mesosiderite meteorite from the Putorana Plateau, north central Siberia (Noril'sk district). The rock is a mixture of basaltic fragments in a basaltic matrix with abundant Ni-bearing metal. However, the composition of the rock and its minerals are not consistent with known mesosiderites nor with other meteorites. It is probably not a meteorite, as it contains no cosmogenic ^{26}Al, and as similar metal-bearing basaltic rocks are found in the find area [1,2]. The rock could be a terrestrial impact breccia, or could reflect complex magmatic processes.

The Rock: The Putorana rock is an annealed breccia of basaltic clasts in a matrix of basaltic and metallic minerals. The rock's exterior is weathered and rusted, without obvious fusion crust. The interior is essentially unweathered.

Breccia fragments include basalt of several textures, fine-grained "anorthosite," and feldspathic dunite (Figure). Plagioclase is the most abundant mineral in most basalts, and forms euhedra of mm to cm size. Olivine and rare ilmentite cocrystallized early with the plagioclase. Pigeonite crystallized later, filling spaces among plagioclase euhedra and partially replacing olivine. The "anorthosite" consists of ovoid masses of nearly pure plagioclase. Metallic grains are rare in the clasts, and compose ~50% of the matrix. The cores of these grains are Fe-Ni metal with exsolution lamellae and blebs of Cu-rich metal. The cores are surrounded by cohenite, Fe-carbide. Rare mm-sized grains of Cu-rich metal are also present.

The minerals are of nearly constant composition: olivine Fo_{42}, FeO/MnO=110; pigeonite $En_{49}Fs_{54}Wo_{06}$, FeO/MnO=70; augite $En_{37}Fs_{28}Wo_{35}$, FeO/MnO=65; opx; plagioclase, from An_{59}--An_{79}, avg. $An_{67}Ab_{30}Or_{03}$; ilmenite; Fe-Cu-sulfides(?); and apatite(?). Metallic minerals include: Fe-Ni metal (2.3%Ni, 0.54%Co; 0.2%Cu); Cu metal (6.5%Fe, 1.2%Ni); and cohenite (91.1%Fe, 0.6%Ni, 0.04%Cu).

Natural radioactivity was measured on a 25 gram sample for 10^6 seconds, with detection of live ^{60}Co but not ^{26}Al. Oxygen isotope analysis are in progress.

An Origin: The Putorana rock is probably not a meteorite. Absence of live ^{26}Al suggests a terrestrial origin, as does the Ab content of the plagiolcase. The metallic phases in Putorana are similar to those in other basaltic rocks of the find area [1-3] and to those in the Disko island basalts [4], where basaltic magma reacted with carbonaceous sediments. The long thermal history required for homogenization of mineral compositions and for pigeonite exsolution makes a human origin unlikely. However, FeO/MnO ratios of the mafic silicates are identical to those from lunar basalts, and the presence of anorthositic material is reminiscent of lunar breccias.

Meteoriticists should be aware that this material is available and abundant in central Russia. It looks like mesosiderite, qualitative colorimetric tests for Ni are positive, and (on initial examination) the cohenite can be mistaken for tetrataenite. More detailed examination will reveal minerals and mineral compositions that are not characteristic of known mesosiderites.

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Figure. BSE images. a) Fine-grained basalt clast. b) Fine-grained "anorthosite" clast. Scale bar 200 µm.