UNMELTED ACHONDRTIC MICROMETEORITES FROM THE NOVAYA ZEMLYA GLACIER.  D. D. Badjukov1, F. Brandstätter2, J. Raitala3, and G. Kurat2. 1V.I. Vernadsky Institute RAS, Kosygin str. 19, 119991, Moscow, Russia, badjukov@geokhi.ru, 2Naturhistorisches Museum, Burgring 7, 1010 Wien, Austria, 3Astronomy, University of Oulu, PO BOX 3600, Finland.

Introduction: During the last decades, a huge number of micrometeorites (MMs) were collected from glaciers of Greenland and Antarctica [1]. It has been well established that MMs are related to carbonaceous chondrites mostly [2] and only one basaltic unmelted MM (UMM) and rare achondritic cosmic spherules were found in Antarctic MM collections [3,4]. A large suite of MMs was recovered from glacier deposits located at the the Novaya Zemlya ice sheet. The particles comprise melted, partially melted and unmelted groups of micrometeorites. UMMs are dominated mostly by chondritic matter but also achondritic UMMs are present.

Description: Out of a total sample of 176 UMMs four - according to their textures, mineralogy, and chemistry - are classified as basaltic breccias. They have irregular shape and are transected by irregular cracks; with two of them containing vesicles. Two particles have discontinuous magnetite rims. Three particles consist of angular mineral fragments embedded in various glassy matrices. The constituent phases are low- and high-Ca pyroxenes, plagioclase, silica, ilmenite, chromite, and glass. Compositions of pyroxenes in the UMMs differ from each other with average Fs contents of low-Ca pyroxenes of 10, 30, 55, and 58 mol% in particles NZ6-2-4,5, NZ6-2-4,33, NZ6-1-1,44, and NZ6-2-5,15 respectively. The composition of high-Ca pyroxenes is Fs42Wo33-44, Fs35-42Wo18-24, and Fs35-42Wo18-24 for UMMs NZ6-2-4,5, NZ6-1-1,44, and NZ6-2-5,15 respectively. The pyroxene average Fe/Mn atomic ratios for UMMs NZ6-2-4,33 and NZ6-2-5,15 are 31 and 30, respectively whereas UMMs NZ6-1-1,44 and NZ6-2-4,5 have Fe/Mn ratios of 24.6 and 18.7 respectively. Plagioclase in three UMM is bytownite and UMM NZ6-2-4,5 contains An75-80. Bulk compositions of the particles obtained by defocused microprobe beam technique are close to basalts.

Summary: Based on textures and compositions of basaltic melt breccia UMMs we suggest that they originated from surface layers of a basalt-bearing asteroid that has been re-worked by high velocity impacts. Pyroxene Fe/Mn ratios combined with An contents in plagioclase [5] indicate for two UMMs a possible relationship to eucrite and/or mesosiderite meteorites whereas two others seem to have two distinct parent bodies of a composition, which is not present in meteorite collections. However, the conclusion needs to be further investigated utilizing trace element abundances and isotope studies. The basaltic breccia UMMs constitute 0.5 % of the total population of the Novaya Zemlya MM suite. This content should be lowered to 0.25 % if this MM collection is biased statistically due to depletion in some group(s) of UMMs, e.g., carbonaceous UMMs.

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