GLASSES IN MICROMETEORITES.
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Introduction: Micrometeorites (MMs) are by far the most common extraterrestrial matter collected by the Earth that constitutes a class of its own with relationships to CM chondrites [1] and comets [2]. Recently, extensive studies of glasses in meteorites were rewarding and lead to the formulation of a new model of the formation of chondritic constituents and also non-chondritic meteoritic rocks [3-5]. As no such data existed for MMs, we started a study to fill this gap. Here we give a preliminary report on the results obtained on MMs collected from the Antarctic ice near Cap Prudhomme.

Samples and results: MMs labeled 10M, M92-6b, AM9 and M1-M7 (NHM, Vienna) are of the crystalline MM type as define by [1]. All of them are mainly (e.g., Mc7 and AM9) or exclusively (e.g., 10M and M92-6b) composed of euhedral to subhedral olivine in clear mesostasis glass. Glass inclusions in olivine are also composed of clear glass and a shrinkage bubble and range in size from 5 to 10 µm. The chemical composition of glasses is given in the Table. The primary glass inclusions of the 10M and *M92-6b* MMs are hosted by olivines containing 16.6 and *28.5 wt%* FeO and 0.03 and *0.36 wt%* CaO, respectively.

	10M		**92-6b**	
	Mesostasis	Glass Incl.	Mesostasis	Glass Incl.
SiO2	56,0	56,9	52,7	53,7
Al2O3	8,1	7,6	9,2	13,5
TiO2	0,35	0,25	0,44	0,56
Cr2O3	0,21	0,31	0,09	0,07
FeO	8,7	9,7	17,3	11,9
MgO	13,4	9,5	10,2	3,05
CaO	7,7	8,5	3,8	4,02
MnO	0,32	0,27	0,38	0,17
Na2O	3,81	3,00	3,62	4,73
K2O	0,62	0,20	0,83	1,24
Total	99,2	96,2	98,6	92,9

Discussion: Glasses in the studied MMs have high contents of FeO and MgO as compared to clear inclusion glasses in olivines and mesostasis of carbonaceous and ordinary chondrites constituents (FeO and MgO contents in CC and OC are <4 and <7 wt%, respectively – e.g., [3,4]). However, the contents of both elements match those observed in experimentally heated glasses from Allende [6] suggesting that glasses in MMs have suffered a thermal event, which is no surprise. In addition, the texture of MMs, as well as the similar chemical composition of inclusion and mesostasis glasses with respect to olivine-incompatible elements, indicates that these glasses are not pristine. The samples investigated by us very likely are the product of MM melting during atmospheric entry – as are the olivines associated with them. Variations in the local redox conditions experienced by individual MMs could explain variable losses of Fe from the melt from which the new olivines grew as well as non-equilibrium Cr and Ca distributions between glasses and olivines [e.g.,7].

References: [1] Kurat et al., 1994. *Geochimica et Cosmochemica Acta* 58, 3879-3904. [2] Maurette 2006. Springer Verlag, Berlin. pp. 330. [3] Varela et al., 2005 *Icarus* 178, 2, 553-569. [4] Engler et al., 2007. *Icarus* 192, 248-286. [5] Varela and Kurat, 2008, *Icarus (submitted).* [6] Varela, 2008. *Geochimica et Cosmochemica Acta (in press).* [7] Green, 1994. *Chemical Geology* 117, 1-36.