MISSING "CARROTS" IN THE STARDUST AEROGEL.

M. Maurette[1] and G. Kurat[2]. [1]CSNSM, Bat. 104, 91406 Orsay-Campus, France, maurette@csnsm.in2p3.fr. [2]Institut für Geologische Wissenschaften, Universität Wien, Althanstrasse 14, 1090 Vienna, Austria.

Introduction: Stardust apparently produced exciting results – as can be deduced from the scarce data available (e.g., NASA Stardust Web site). The conclusions drawn, however, seem to reflect a certain degree of confusion among investigators who either reach the grand conclusion that "...*the Stardust minerals may have crystallized from melts near other stars...*" and "...*at least some comets may have included materials ejected by the early sun to the far reaches of the solar system*". There is no grand surprise with the mineralogical findings on Wild 2 particles (W2s) as they can be expected from what we know from meteorites, Antarctic micrometeorites (AMMs) and stratospheric IDPs [e.g., 1]. We discuss here our earlier prediction of a possible link between cometary matter and AMMs [2].

Bulbs against carrots: The W2s recovered at the terminus of about 20 well visible tracks in the aerogel (with length of up to 12 mm) are made of refractory minerals (forsterite, enstatite, diopside, spinel, anorthite). These tracks have a "bulb" shape very different from the "carrot" shape observed for all projectiles fired into aerogels at speeds similar to that of the W2s (~6 km/s), as to assess their survival during aerogel capture [4]. These spectacular "bulbs" are sprayed with tiny shell-splinters tracks. This bulb shape probably is the result of a powerful microscopic explosion ignited along the track of the W2s.

Saponite rich chondrites without chondrules: Saponite is the dominant hydrous silicate of IDPs and AMMs. Suppose that it is also the dominant hydrous phase of the W2s before their impact into the aerogel. This mineral contains structural water that starts to be released at a low temperature of ~100 °C. In contrast, the artificially accelerated projectiles included: – anhydrous minerals, such as those found <u>in chondrules</u>; – fragments of the "dry" Allende chondrite; – a mineral of the serpentine group (lizardite); – fragments of the Orgueil and Murchison chondrites, where serpentine is the dominant hydrous silicate.

Serpentine-rich projectiles yielded carrot-shaped tracks, probably because serpentine only contains OH groups that are released at a temperature of ~600 °C. Therefore, the dominant bulb shape of the W2s tracks would reflect the explosive release of the constituent water of the W2s saponite as well as a strong depletion of chondrules in the W2s flux. Only the largest refractory phases of the W2 "shrapnel" could continue and form a long track beyond the "bulb". Surprisingly, the missing raw carrots alone would reveal two major similarities between IDPs, AMMs and the W2s (i.e., the existence of saponite and a depletion of chondrules). In this case, the chemical and isotopic compositions of the AMMs and W2s olivines should be similar [4].

References: [1] Maurette M. 2006. *Micrometeorites and the Mysteries of our Origins* (Springer-Verlag Berlin Heidelberg), pp. 1-330. [2] Maurette M. 1998. In, Brack A. (Ed.) *The Molecular Origin of Life* (Cambridge University Press), pp. 147-186. [3] Burchell M.J. et al, 2006. *MAPS* 41:217-232. [4] Engrand C. et al., this volume.