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Analysis of cosmic spherule candidates from the Kwajalein micrometeorite collection

P. J. WOZNIAKIEWICZ[12], M. C. PRICE[2], J. P. BRADLEY[3], H. A. ISHII[3], S. S. RUSSELL[1], M. E. ZOLENSKY[4], D. E. BROWNLEE[5]

[1]Earth Sci. Dept., Natural History Museum, London SW7 5BD. UK. p.wozniakiewicz@nhm.ac.uk
[2]Sch. Phys. Sci., Univ. of Kent, Canterbury, CT2 7NH. UK.
[3]Inst. Geophys & Planet, Univ. of Hawai'i, Honolulu. USA.
[4]NASA Johnson Space Centre, Houston, TX. USA
[5]Dept. Astronomy, Univ. of Washington, Seattle, WA. USA

The Kwajalein micrometeorite collection utilised high volume air samplers fitted with 5 μm laser-etched polycarbonate membrane filters to capture particles directly from the atmosphere. The filters were changed weekly over several months throughout 2011/12, providing the opportunity to investigate the contemporary flux of micrometeorites [1]. We recently reported the results of our initial survey of cosmic spherule-like particles on several of these filters [2]. We identified three main groups of particle based on bulk compositions: 1. Silicate spherules rich in Mg, Ca and Fe, 2. Silicate spherules rich in Al, Ca, K and/or Na and 3. Fe-rich spherules. Abundances appearred to change over time suggesting links with celestial activity (e.g. meteor showers), however, spherules similar to groups 2 and 3 can be produced by terrestrial and anthropogenic activity (e.g. volcanic microspherules exhibit similar compositions to group 2 spherules and metallic spherules similar to those of group 3 can be formed during fuel combustion [3, 4]). We are now studying the internal structures and chemistries of these spherules and comparing against cosmic spherules identified in other collections to confrim their origins and further contrain the contemporary micrometeorite flux [e.g. 5, 6].

Particles are being picked, embedded in resin and polished through to reveal their interiors. Here we will describe our ongoing analyses of these particles via SEM. We will also introduce our new collection using this method that is currently being performed in the Antarctic.

[1] Wozniakiewicz et al. *LPSC XXXXV* #1823 [2] Wozniakiewicz et al. 2014 *77th MetSoc*. #5274 [3] Lefèvre et al. 1986. *Nature* 322:817 [4] Snowball et al. 2014. In *A Stratiagraphical basis for the Anthropocene*. Geol. Soc., London. Spec. Pub. 395:119 [5] Taylor et al. 2000. *MAPS* 35:651 [6] Genge et al. 2008. *MAPS* 43:497.

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