Mercury (Hg) in meteorites from antarctic and museum collections

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The calculated half condensation temperature of Hg (252 K [1]) is only 70 K higher than that of water. Therefore, Hg is of interest to trace processes affecting volatiles in the early solar system. In meteorites, Hg may be significantly affected by terrestrial contamination [e.g. 1]. However, several studies argued that pervasive contamination of meteorites by Hg should be difficult [2-4]. Nevertheless, there are good reasons why meteorites from museum collections may be contaminated. Most significant is the widespread use of Hg salts as pesticides in the preparation of biological museums specimens. For example, the Smithsonian National Museum of Natural History reports that objects were protected by scattering crystalline mercuric chloride in the corners of closed drawers [5]. To further evaluate this issue, we compare Hg abundances in meteorites from antarctic and museum collections including literature data [2, 3] for the latter. Museum samples range from below 10 to > 10000 ng/g, with the highest values in CI, CM and H chondrites. In contrast, antarctic samples and desert finds [2] never contain more than 352 ng/g. Overall, Hg abundances in samples from museum collections are often 2 to 3 orders of magnitude higher than in comparable antarctic samples. Data obtained for the Orgueil CI chondrite measured in three different studies yields high and variable abundances of 10,400 ng/g [3], 88,000 ng/g [4] and 224,000 ng/g (this study). Models of s-process nucleosynthesis [6] suggest a CI abundance of about 260 ng/g. The antarctic CI chondrite Y-980115 contains 43 ng/g Hg, but represents a heated CI chondrite [7,8]. In summary, values orders of magnitude higher in samples from museum collections are due to terrestrial contamination. Thus, many Hg isotope and abundance data derived from museum samples [2-4] are not relevant for early solar system studies. In addition, we observed that Hg in carbonaceous chondrites does not behave like other highly volatile elements (e.g. Cd).

[1] Lodders (2003) *Astrophys. J.* **591**, 1220-1247. [2] Lauretta *et al.* (2001) *GCA* **65**, 2807-2818. [3] Meier *et al.* (2016) *GCA* **182**, 55-72. [4] Wiederhold and Schönbächler (2015) 46th LPSC, 1841. [5] Goldberg (1996) *J. Am. Inst. Conserv.* **35**, 23-43. [6] Lauretta *et al.* (1999) *EPSL* **171**, 35-37. [7] King *et al.* (2015) *GCA* **165**, 148-160. [8] Braukmüller *et al.* (this meeting)