HYDROGEN ISOTOPIC RATIO IN IRON METEORITES.
C. Defouilloy[1], R. Duhamel[1], F. Robert[1], [1]LMCM, CNRS-MNHN Paris, France.

Introduction: Iron Meteorites are generally thought to be samples from the core of differentiated bodies. But their age calculated with the Re/Os radiochronometer shows they are among the oldest bodies of the Solar System [1]. Thus, a possible condensation of metallic material from the Solar Nebula could also be considered. The D/H ratio of different bodies in the Solar System has been measured and varies from 25 $x10^{-6}$ (δD=-870‰) [2] in the Solar Nebula up to 1200 $x10^{-6}$ (δD=+6700‰) [2] in some whole rock carbonaceous chondrites.

Consequently, the D/H ratio in Iron Meteorites could be an indicator of their origin. An analytical technique for measuring the D/H ratio of Iron meteorites using ion microprobe is currently being tested and calibrated using metallic standards.

Experiments: Hydrogen isotopic composition is determined with the CAMECA IMS 3f at the National Museum of Natural History in Paris, France. Samples are mounted either in epoxy and Au-coated or as polished thin sections. A primary positive Cesium beam, with intensity ranging from 5 to 10 nA, was focused to produce a 30µm diameter beam. Because of the highly conductive nature of these metallic samples, the use of an electron gun is unnecessary. Entrance and Exit slits as well as the Energy slit are kept wide open. Under these conditions, the mass resolution is <400 (with the Cs^+ primary beam the possible mass interference between H_2^- is D^- is negligible). In order to assess the possible terrestrial contamination a sample from the Coahuila meteorite has been saw and polished with deuterated alcohol; results are compared with its non-deuterated counterpart.

Results: The comparison of the depth profiles between deuterated and non-deuterated sample shows a contamination restricted at the surface of the sample (equivalent of one hour of sputtering). Further inside, no evidence of contamination is detectable i.e. the D/H ratio of the deuterated sample reaches a plateau with depth that is indistinguishable from the non-deuterated sample. The absolute values for H concentration and D/H ratio are within ± 0.5 % and ± 20 ‰, respectively (2 sigma).

References : [1] Smoliar et al. (1996) Science, 271, 1099-1102, [2] Deloule and Robert (1995) GCA, 59, 4695-4706.