TRACE ELEMENT COMPOSITION OF A SULPHIDE NODULE IN TOLUCA IAB IRON. G.K. Benedix[1], S.J. Hammond[2], M. Rehkämper[3], M. Schönbachler[4], R. Andreasen[3], K. Theis[4], N.W. Rogers[2], and P.A. Bland[1,3,5]. [1] Impacts and Astromaterials Research Centre (IARC) and Dept. of Mineralogy, The Natural History Museum, Cromwell Road, London, UK SW7 5BD (g.benedix@nhm.ac.uk) [2]Dept. of Earth and Environmental Science, The Open University, Milton Keynes, MK7 6AA, UK. [3]IARC and Dept. of Earth Science and Engineering, Imperial College London, London, SW7 2AZ, UK. [4]SEAES, The University of Manchester, Manchester M13 9PL UK. [5]Dept of Applied Geology, Curtin University of Technology, GPO Box U1987, Perth WA 6845, Australia

Introduction: Sulphur is a common element in the solar system and, indeed, is the 6th most abundant element on Earth. In meteorites, sulphur most often occurs in the form of Fe sulphides (troilite) and, more rarely when formed under very reducing conditions, as Ca (oldhamite), Mn (alabandite), and Mg (niningerite) sulphides. Troilite is uquitious in iron meteorites [1]. A recent study [2] was undertaken to determine the initial solar system abundance of ^{205}Pb and ^{205}Tl, using the decay scheme ^{205}Pb$\Rightarrow$^{205}Tl ($t_{½}$ = 15My). To do this, Pb and Tl were measured in metal and sulphide in IAB iron meteorites. A correlation between ^{205}Tl composition and ^{204}Pb/^{203}Tl was found in the metal phase and interpreted as an isochron. However, this correlation was not found in sulphides from the same meteorites, which causes some concern in the interpretation of the metal phase isochron data. The explanation was that the Tl isotope system was disturbed by kinetic stable isotope fractionation in the sulphide. Similar observations were made for the Pd-Ag decay system [3]. In order to better understand sulphide chemistry we have undertaken a study to explore the trace element composition of sulphide in Toluca (IAB iron) to determine the level of chemical disturbance that might exist in these nodules.

Sample and Analytical techniques: An oval-shaped troilite nodule (~ 1 x 0.5 cm) with a phosphide rim was studied. Major and minor elements were measured with an electron microprobe. Compositions of 19 trace elements (both siderophile and chalcophile) were measured using a New Wave 213 nm UV laser system, coupled to an Agilent 7500a quadrupole ICP-MS. Samples were ablated in a He atmosphere, and mixed with argon via a "y" connector before entering the plasma. Data reduction was carried out using the GLITTER software, using the NIST 610 glass standard to provide an external calibration. In addition, Hoba, Filomena, and the NIST steel (1262b) were analysed as unknowns, to provide a measure of accuracy.

Results and Discussion: Initial results indicate that for most elements, there is no obvious zoning or variation from metal into and across sulphide. Notable exceptions include Pb, Ti, Cu, and Ni. With the exception of Cu, the variation is not a smooth zonation pattern, but is rather a random pattern. Although varying abundance of Pb may be due to contamination, the fact that variability exceeds a factor of 20 may be cause for concern in future Tl isotope studies. Further analyses will ascertain the source of the variation, but it may be that there are submicroscopic inclusions within the sulphide. Tl is below detection limits in the sulphide and at ~ detection limit in the metal, but may be difficult to discriminate with this technique.

References: [1] Buchwald V. F. 1975. *Handbook of Iron Meteorites*. [2] Nielsen S.G. et al. 2006. *GCA* 70:2643-2657. [3] Woodland et al. 2005, *GCA* 69: 2153-2163.