Noble gases in a graphite-metal inclusion from Canyon Diablo: The presence of El Taco Xe in IAB iron meteorites.

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Introduction: The primordial components of noble gases in iron meteorites are very important for a better understanding of the origin and evolution of iron meteorites. Some inclusions such as graphite and troilite contain large amounts of primordial gases, and give us useful information. Mathew and Begemann [1] reported that graphite inclusions of the El Taco IAB iron meteorite contained a new noble gas end-member "El Taco Xe", whose definition was subsequently slightly modified by Maruoka [2]. El Taco Xe was also observed in the Bohumilitz and Toluca IAB iron meteorites [3]. This time we had the opportunity to investigate a very large graphite-metal inclusion (about 2.5cm in diameter) from the Canyon Diablo IAB iron meteorite [4]. We have measured the elemental abundances and isotopic compositions of all noble gases in this inclusion.

Sample and Experiment: As this inclusion consists of graphite and metal (dissipated and in veins), we crushed it into several pieces and treated some parts of them with 6M HCl to remove the metal. The noble gas measurements were made by precise step-wise heating technique (600, 800, 1000, 1200, 1400, 1600, 1800 °C) with the mass spectrometer VG5400 at Osaka University.

Results: The Ne data of the 600-1200 °C fractions lie on the mixing line between air and the spallogenic component, but those of 1400 and 1600 °C lie on the mixing line between Ne-HL and the spallogenic component. There is no detectable contribution by a solar component, indicating that the primordial component of Ne is a planetary component, which is compatible with our previous result [5]. The Ar isotope data indicate the presence of Q in addition to Ar-HL, air and a spallogenic component. As the elemental concentration of Ne in Ne-Q is low, we could not confirm the presence of Ne-Q from Ne data. The Xe isotopic data shows that there is no indication for the presence of Xe-HL. As the Xe component in Q is very high and the Xe/Ne ratio in Q is much higher than that in the HL component, only the contribution of Q is observed in Xe data. All isotopic data of Xe can be explained by a mixture of only Q, air and El Taco Xe. The presence of El Taco Xe is very well confirmed in the $^{130}Xe/^{132}Xe$ vs. $^{136}Xe/^{132}Xe$ plot. It is likely that El Taco Xe is universally present in IAB iron meteorites.

References: [1] Mathew K. J. and Begemann F.1995. *Geochim. Cosmochim. Acta* 59: 4729-4746 [2] Maruoka T. 1999. *Geochem. J.* 33: 343-350. [3]Maruoka T. et al. 2000. *Meteoritics & Planetary Science* 36:597-609. [4] Kurat G. et al. 2000 31st *Lunar Planetary Sci. Conf.*, # 1717. [5] Namba M. et al. 2000. *Antarctic Meteorite Research* 13:170-176.