^{40}Ar-^{39}Ar STUDIES OF HEAVILY-SHOCKED YAMATO CHONDRITES.

T. D. Swindle[1] and M. Kimura[2]. [1]Lunar and Planetary Laboratory, University of Arizona, Tucson AZ USA. tswindle@u.arizona.edu. [2]Faculty of Science, Ibaraki University, Mito, Japan.

We have begun a ^{40}Ar-^{39}Ar study of heavily-shocked Yamato chondrites, both to build the data base on the chronology of impact events in the Main Asteroid Belt and to better understand the histories of these specific meteorites. Here we report on a study of Yamato-75100 (Y-75100), a heavily-shocked (S6) H6 with shock veins containing a variety of high-pressure minerals, including Ca-rich majorite [1]. We have analyzed four samples of the host chondrite and two samples of vein materials.

All of the samples exhibit low apparent ages at low extraction temperatures (as low as 1500-2000 Ma), with apparent age increasing with increasing extraction temperature. Five of the six samples exhibit what resembles a plateau at intermediate temperatures, followed by lower apparent ages (presumably the result of recoil during irradiation) at the highest temperatures. If most or all of these gave the same answer, one would think that answer would be the age of some major event in the meteorite's history, but they do not. Actually, the two vein samples agree at about 4420 Ma, and three of the four host samples agree at about 4300 Ma (the fourth doesn't have anything that qualifies as a plateau). However, those two numbers disagree with each other, and the samples all come from the same meteorite. Our interpretation is:

1) There was a thermal event, probably a shock, no earlier than ~1500-2000 Ma ago (the lowest apparent ages) that caused partial resetting of the K-Ar system in this meteorite. If it was the vein-forming event, the rapid cooling of the vein [1] must have prevented total resetting.

2) The most recent event before that was probably no more recent than 4420 Ma (the plateau age in the veins), and could have been earlier. This could be the formation or metamorphism on the parent body. Alternatively, if this was the shock event that produced the veins, it must have happened during the accretionary phase of the Solar System. Although most chondritic impact melts record more recent events, there are a few others that survive from the accretionary era. The H chondrites Portales Valley [2] and Ourique [3] record impacts from this era, as do a few L chondrites, including Sahara 98222 [4]).

3) In the most recent event, the host material lost slightly more Ar than the veins did. This seems to be in constrast with the chemistry results of [5], which suggested that if there was any difference, the veins might be depleted in the most thermally labile elements. However, if the most recent event that affected the Ar was not the shock that created the veins [6], the more recent event might not have been strong enough to cause much loss of Zn or Ag anywhere, but there could have been more loss of those in the vein during the vein-producing shock event.

References: [1] Tomioka N. and Kimura M. 2003. *Earth & Planetary Science Letters* 208:271-278; [2] Garrison D. H. and Bogard D. D. 2001. Abstract #1137. 32nd Lunar & Planetary Science Conference; [3] Kring D. A. et al. 2000. Abstract #1688. 31st Lunar & Planetary Science Conference; [4] Ozawa S. et al. 2008. *Meteoritics & Planetary Science* 43:This issue; [5] Friedrich J. M. et al. 2007. *Meteoritics & Planetary Science* 42:A52; [6] Kunz J. et al. 1997. *Meteoritics & Planetary Science* 32:647-670.