

**COMBINED PALLADIUM-SILVER AND IODINE-XENON ISOTOPE SYSTEMATICS FOR ALLEGAN (H5) AND DHOFAR 125 (ACAPULCOITE).**

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**Introduction:** Short-lived chronometers are ideal for dating processes that occurred early during solar system formation because they record different events depending on the closure temperatures of the specific host minerals. Short-lived chronometers have a high time resolution (~1 My) and thus provide precise ages. However, such age determinations are relative and must be tied to an absolute timescale. This is done by measuring the unknown sample relative to a sample with a well constrained absolute age. Such a sample is currently missing for the Pd-Ag system [1,2] restricting the precision that can be placed on the absolute ages. We have analysed two samples, Allegan, an H5 ordinary chondrite and Dhofar 125, an acapulcoite, for both I-Xe and Pd-Ag in order to cross calibrate the two chronometers. Acapulcoites cooled quickly ( $100 \pm 40$  K/My [3-5]) such that the distinct closing temperatures (T) should not result in resolvable age differences.

**Analytical Techniques:** *Pd-Ag:* the Ag isotope compositions were measured on a Nu Plasma MC-ICP-MS relative to the NIST SRM978a Ag standard. Palladium and Ag concentrations were obtained using isotope dilution. *I-Xe:* samples were irradiated and measured on RELAX [6]. Corrections were applied for fission and trapped Xe before the ages were calculated relative to Shallowater ( $4562.3 \pm 0.4$  My [7]).

**Results and discussion:** *Allegan (H5)* yielded an I-Xe age of  $4565.8 \pm 2$  My for pyroxenes. This just overlaps with the Hf-W age of  $4562.4 \pm 0.9$  My for H5 chondrites, which reflects thermal metamorphism [8]. However, the Allegan I-Xe age is more consistent with the H4 chondrite Hf-W age ( $4566.3 \pm 0.7$  My), which is considered to reflect the robustness of high-Ca pyroxene to thermal metamorphism and dates chondrule formation [8]. Based on this, the I-Xe closure T must be higher than the  $800 - 875 \pm 75$  °C estimated for Hf-W in high-Ca pyroxenes [8]. The closure T for Pd-Ag is lower because the scatter of the Allegan Pd-Ag data indicates a disturbed system. Modeling suggests that Ag from metal was lost to silicates accompanied by stable isotope fractionation. Further I-Xe data from troilites and metal will show whether this is because Ag is mostly hosted in metal or sulphides, which re-crystallize at lower T. *Dhofar 125* yielded an I-Xe age  $4557.9 \pm 0.8$  My for pyroxene, consistent with the I-Xe ages of related lodranites [9]. The Pd-Ag data appears to define an isochron corresponding to an age of  $4549 (+1.2/-8.7)$  My, which just overlaps within error with the I-Xe ages. Modeling indicates that the last reset involved either loss of volatile Ag or addition of metal.

**References:** [1] Schönbächler M. et al. 2008. *GCA*, 72:5330-5341. [2] Horan M. F. et al. 2012. *EPSL*, 351-352:215-222. [3] Pellas P. et al. 1997. *GCA*, 61:3477-3501. [4] McCoy T.J. et al. 1997. *GCA*, 61:639-650. [5] Rubin A.E. 2007. *GCA*, 71:2383-2401. [6] Gilmour J.D. et al. 1994. *Rev. Sci. Instrum.*, 65:617-625. [7] Gilmour J.D. et al. 2009. *MAPS*, 44:573-579. [8] Kleine T. et al. 2008. *EPSL*, 270:106-118. [9] Crowther S. A. et al. 2009. *MAPS*, 44: 1151-1159.