A PRECISE $^{53}$Mn-$^{53}$Cr AGE OF SPHALERITES FROM THE PRIMITIVE EH3 CHONDRITE SAHARA 97158

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A high fraction of enstatite chondrites has $^{40}$Ar-$^{36}$Ar ages close to 4.3-4.6 Ga implying that later collisional events did not severely affect the thermochronological record [1,2]. Hence, short-lived nuclide chronometries potentially enable to decipher the very early history. For few whole rock samples (Indarch EH4/Abee EH4/Khairpur EL6), $^{53}$Mn/$^{53}$Cr initials obtained from isochrones of acid leachates and residues and total rocks [3] of 2.8±0.6, 3.0±0.4 and 1.21±0.06 (all in 10^6) can be used to calculate absolute ages using the LEW86010 anchor (4562.1±1.3/4562.5±0.8/4557.6±0.3) and compared with high temperature 129I-125Xe isochrons [4,5] of 4562.3±0.7/4560.1±0.1/4558.1±0.7 relative to Shallowater [5]. The age differences for Indarch and Khairpur are <0.5 Ma and within analytic and calibration errors. The discrepancy for Abee (2.4 Ma) could be due to age variations within this breccia. Mn-Cr ages of individual sphalerites of Indarch [7] are consistent, but yield a range of (1-10) x 10^6. Sphalerites of other enstatite chondrites (MAC88136, MAC88180, MAC88184, all EL3 [7,8]) date later events indicated by $^{53}$Mn/$^{55}$Mn initials of less than a few 10^5, similar to sphalerites in ALH77295 (EL3) and Qingzhen (EH3) of (2-7) x 10^7 [8].

Using the NanoSIMS at MNHN Paris, three different sphalerite grains of the EH3 Sahara 97158 yielded $^{53}$Cr excess up to $^{53}$Cr=3500 ‰ and $^{55}$Mn/$^{53}$Cr up to 160000. A precise isochron (Fig. all errors are 2σ) defines an initial $^{53}$Mn/$^{55}$Mn ratio of (3.14±0.26) x 10^3, corresponding to an absolute age of 4562.7±0.5 Ma. No difference between individual sphalerites is apparent.