SOLAR SYSTEM INITIAL $^{176}Hf/^{177}Hf$ INFERRED FROM THE EUCRITE NORTHWEST AFRICA 5073

J. Roszjar[1], E. E. Scherer[2], K. Mezger[3], and A. Bischoff[1]. [1]Institut für Planetologie, WWU Münster, Germany. j_rosz01@uni-muenster.de. [2]Institut für Mineralogie, WWU Münster, Germany. [3]Institute of Geological Sciences,University of Bern, Switzerland.

Introduction: Northwest Africa (NWA) 5073 is a new Stannern-trend eucrite with the coarsest texture ever found among eucrite samples [1]. It is mainly composed of pyroxene and plagioclase and comprises abundant mesostasis. The mesostasis primarily consists of tridymite, Ni-poor metallic Fe, troilite, plagioclase, ilmenite, chromite, Ca-phosphate, zircon and baddeleyite. Zr-bearing phases are abundant and up to 25 µm in diameter [1]. Previous Lu-Hf analyses on this sample showed that the whole rock plotted on the external isochron for other basaltic eucrites, but that complex internal Lu-Hf systematics, yielded two ages, 4.68 ± 0.14 Ga and 4.31 ± 0.14 Ga, and two apparent initial values ($^{176}Hf/^{177}Hf_i$), 0.27976 ± 13 (2σ) and 0.28020 ± 8 (2σ) [2]. These results correlate with the petrographic observation that this sample had a complex thermal history [1]. To better define the internal isochron for this rock and to better constrain the Solar System initial $^{176}Hf/^{177}Hf$ value, we separated unradiogenic ilmenite and zircon from the sample.

Methods: Zircon and ilmenite were separated from about 6.7 g of cleaned and crushed sample. These minerals were concentrated with a selective acid digestion procedure using HF-HNO_3-HCl. Via handpicking, a pure ilmenite and an ilmenite-zircon-mixture mineral fraction were separated. Chemical separation and isotope analysis procedures were those of [3] and [4]. Samples were analyzed for their Lu-Hf isotopic composition using an IsoProbe MC-ICP-MS. The accuracy and 2 s.d. external precision of Hf isotope analyses as a function of Hf concentration were evaluated by repeated measurement of standard solutions at different intensities [5]. Ages were calculated using a decay constant of 1.867×10^{-11} year^{-1} for ^{176}Lu (e.g., [3,6]).

Results and Conclusion: The ilmenite fraction lies above the older, 4.68 Ga isochron at low Lu/Hf. The ilmenite+zircon fraction, together with the whole rock and three pyroxene fractions lie on a 4.61 ±0.11 Ga trend. Although this is within error of the expected age of the sample, the initial $^{176}Hf/^{177}Hf$ of 0.279832 (77) is higher than that of some other eucrite isochrons. This may suggest that ilmenite in the ilmenite+zircon fraction either partially re-equilibrated isotopically during a heating event or it lost some Lu during the selective digestion procedure. In either case, it seems that a pure zircon fraction, if recovered, might yield a somewhat lower initial $^{176}Hf/^{177}Hf$ than the value reported here.

References: [1] Roszjar J., Metzler K., Bischoff A., Barrat J.-A., Geisler T., Greenwood R. C., Franchi I. A., Klemme S. 2011. *Meteoritics & Planetary Science,* submitted. [2] Roszjar J. and Scherer. E. E. 2010. *Meteoritics & Planetary Science* 45:A175. [3] Scherer E. E., Münker C., Mezger K. 2001. *Science* 293:683-686. [4] Münker C., Weyer S., Scherer E., Mezger K. 2001. *Geochemistry Geophysics Geosystems* 2:1064, doi: 10.1029/2001GC000183. [5] Bizzarro M., Baker J. A., Haack H., Ulfbeck D., Rosing M. 2003. *Nature* 421:931-933. [6] Söderlund U., Patchett P. J., Vervoort J. D., Isachsen C. E. 2004. *Earth and Planetary Science Letters* 219:311-324.