COMPARING EARLY SOLAR SYSTEM CHRONOMETERS.

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Introduction: Short-lived radionuclides provide a tool for the precise determination of early solar system chronology but yield only relative ages. In order to compare different chronometers, and to obtain absolute ages, requires anchoring to a chronometer such as Pb-Pb in suitable solar system objects. Various solar system components have been proposed (summarised in [1]) but no scheme yet yields complete consistency. Here we report results from I-Xe analyses of mineral separates of Indarch (EH4), Khairpur (EL6) and Asuka 881394 (cumulate eucrite) in order to further assess chronometer correlation schemes, particularly that proposed by [1]. These samples were selected because literature information from other chronometers was already available.

Experimental: Samples were crushed and hand-picked under clean conditions in Manchester and the NHM, London. These separates were then neutron irradiated along with chips of Shallowater (SW). Irradiated samples were analysed for xenon isotopes using RELAX [2] in Manchester using a step-heating technique. Similar analysis of SW allows us to determine the $^{128}Xe/^{127}I$ conversion factor.

Results and Discussion: Step-heating of Indarch pyroxene (IndP), Khairpur silicate (KPB) and Khaipur magnetic (KPA) fractions produced excellent correlations, with identical results within error for KPA and KPB (Table 1). No $^{129}Xe^{*}/^{127}I$ correlation was observed for either the eucrite feldspar (AsF) or pyroxene (AsP). Both the Al-Mg and Mn-Cr chronometers indicate an old age for A 881394 [3] suggesting that some late event (>60 Ma after SW) has completely reset the I-Xe system in this eucrite, hence it is unsuitable for comparing chronometers.

Comparing Chronometers. These I-Xe ages have been compared to literature Mn-Cr ages for Ind [4] and KP [5] in the context of the calibration scheme proposed by [1]. The chronometers record similar age intervals between Ind and KP. However, there is a significant difference between the I and Mn absolute ages. Better agreement between I and Mn ages may be achieved for these samples by accounting for a possible solar system ^{53}Mn heterogeneity, proposed by [6].

Separate	**IndP**	**KPA**	**KPB**
$^{129}I/^{127}I$ (x10^{-5})	11.5±0.39	9.25±0.51	8.98±0.31
[I] (ppb)	100	22	30
Age wrt. SW (Ma)	0.5	-4.4	-5.1
Abs I age (Ma)	4565.9±1.2	4560.9±1.3	4560.3±1.2
Abs Mn age	4561.9±0.6	4557.7±0.6	

TABLE 1: Analytical errors are 1σ. Negative relative ages indicate time *after* SW. Absolute ages obtained using the scheme proposed by [1]. Mn-Cr ages calculated from [4] and [5].

References: [1] Gilmour J. D. and Saxton J. M. (2001) *Phil. Trans. R. Soc. Lond., A359,* 2037-2048. [2] Gilmour J.D. et al. (1994) *Rev. Sci. Instrumen., 65,* 617-625. [3] Nyquist L. E. et al. (2001) *MAPS, 36,* A151-152. [4] Shukolyukov A. and Lugmair G. W. (1998) *LPS XXIX,* abs# 1208. [5] Shukolyukov A. and Lugmair G. W. (1999) *LPS XXX,* abs# 1093. [6] Lugmair G. W. and Shukolyukov A. (1998) *GCA, 62,* 2863-2886.