

Tuesday, March 11, 2008

POSTER SESSION I: EARLY SOLAR SYSTEM AND PLANET FORMATION

6:30 p.m. Fitness Center

Van Orman J. A. Kleine T. Bourdon B.

*Closure Temperature of the  $^{182}\text{Hf}$ - $^{182}\text{W}$  System in Chondrites: A Model* [#2232]

We present a model for the diffusive transfer of  $^{182}\text{W}$  between silicates and metal, and apply it to the calculation of Hf-W closure temperature and thermal history of ordinary chondrites.

Amelin Y. Zartman R. E. Ireland T. R. Dunn S. Krot A. N. Yin Q.-Z.

*The  $^{232}\text{Th}/^{238}\text{U}$  Ratio in Meteorites from Pb Isotopes: A Valuable By-Product of U-Pb Dating* [#1602]

We review the errors involved in calculation of the  $^{232}\text{Th}/^{238}\text{U}$  ratio from Pb isotopic composition, compare this ratio with directly measured  $^{232}\text{Th}/^{238}\text{U}$  ratios, and discuss various applications of this parameter to the studies of the early solar system.

Filtner M. J. Crowther S. A. Gilmour J. D.

*The I-Xe System and the Early History of the LL Chondrite Parent Body* [#1654]

I-Xe data from Bishunpur and Krymka indicates late resetting of the system in these primitive LL chondrites. We suggest that the spread of chondrule ages from primitive LL chondrites records a decline in impact rate in the early solar system.

Nebel O. Wombacher F. Mezger K.

*High-Precision Rubidium Isotope Analyses in Chondritic Meteorites* [#1859]

We present first isotope data of the moderately volatile element Rb in stony meteorites analysed with MC-ICPMS.

Gilmour J. D. Middleton C. A.

*Why is the Canonical  $^{26}\text{Al}/^{27}\text{Al}$  Ratio  $5 \times 10^{-5}$ ?* [#1970]

We note that the canonical  $^{26}\text{Al}/^{27}\text{Al}$  ratio is close to that required to melt planetesimals, and explore reasons why this should be the case.

Caffee M. W. Faestermann T. Hertenberger R. Herzog G. F. Korschinek G. Leya I. Reedy R. C.

Sisterson J. M.

*Some Helium-3 Cross Sections and Implications for Early Solar System History* [#1258]

We measured some nuclear cross sections needed to assess local irradiation models for the early solar system. A one-stage irradiation by protons and  $\alpha$  particles, either with or without  $^3\text{He}$ , seems unable to explain meteoritic observations.

Peto M. Jacobsen S. B.

*$^{244}\text{Pu}$  and Early Solar System Chronology* [#2499]

The initial inventory of  $^{244}\text{Pu}$  in the solar system is lower than the commonly accepted value. This has significant implications for Pu-Xe chronology of early atmospheres.

Mimoun B. Gounelle M. Young E. D. Shahar A. Kearsley A. T.

*Magnesium Isotopic Composition of CAIs and Chondrules from CR Chondrites* [#1639]

We measured the Mg isotopic composition of five CAIs and nine chondrules in four CR chondrites using LA-ICPMS. Live  $^{26}\text{Al}$  was found in all CAIs and in one chondrule.

Nagashima K. Krot A. N. Huss G. R.

*$^{26}\text{Al}$  in Chondrules from CR Carbonaceous Chondrites* [#2224]

Three out of six CR chondrules show resolvable excesses of  $^{26}\text{Mg}$ . Their initial  $^{26}\text{Al}/^{27}\text{Al}$  ratios are lower than those of OC and CO chondrules, which could imply formation of most CR chondrules postdated the formation of most OC and CO chondrules.

Pravdivtseva O. Meshik A. P. Petaev M. I. Hohenberg C. M.

*I-Xe Ages and the Thermal History of the Toluca IAB Meteorite* [#2504]

The I-Xe system in Toluca silicates seems to survive catastrophic impact and breakup of the IAB parent body. As a result of cooling at about  $40 \pm 20$  K/Ma, the I-Xe system in the high-Mg pyroxenes in Toluca nodules closed at about 4559.7 Ma, in low-Mg pyroxenes at 4553.6–4548.9 Ma.

Tschauner O. Asimow P. D. Ahrens T. J. Kostandova N. Sinogeikin S. Liu Z.

*Formation of High-Pressure Silicate Phases in Shock Experiments* [#1488]

The first successful synthesis of high pressure Mg-silicate phases in a shock experiments reveals as yet unknown ultrafast growth rates in shocked melts and puts new constraints on planetesimal sizes in the early solar system.

Muralidharan K. Deymier P. A. Stimpfl M. Drake M. J.

*Adsorption as a Water Delivery Source in the Inner Solar System: A Kinetic Monte Carlo Study* [#1401]

Many Earth oceans of water can be adsorbed onto grains in the accretion disk in the region of the terrestrial planets.

Smyth J. R.

*Water Planets and Water in Nominally Anhydrous Minerals* [#1115]

Searches for water-bearing planets may be facilitated by an understanding that many times the amount of water in Earth's oceans is tied up as trace hydrogen in nominally anhydrous minerals of the mantle.

Day J. M. D. Rudnick R. L. McDonough W. F. Walker R. J. Taylor L. A.

*Lithium Isotope Constraints on Magma Ocean Differentiation and the Composition of the Terrestrial Planets* [#1072]

The anhydrous nature of the Moon makes it an ideal location for determining Li isotope fractionation during igneous differentiation. Assuming limited Li isotopic fractionation, mare basalts can be used to estimate the Li composition of the Earth-Moon system.

Holland G. Ballentine C. J.

*The Accretionary Origin of Noble Gases in the Earth's Mantle* [#1243]

Magmatic CO<sub>2</sub> natural gases in SW USA provide a unique insight into the accretionary origin and subsequent evolution of noble gases and related volatiles in the Earth's mantle. Here we suggest a common trapped accretionary source for all noble gases.

Simon J. I. DePaolo D. J.

*Mass-dependent Ca Isotopic Differences Between Chondrites and the Earth* [#1942]

Chondrites exhibit Ca isotopic signatures that appear to represent evaporative loss during accretion. Data lie along a trend consistent with that expected of mass-dependent fractionation and lie between terrestrial carbonate and volcanic rocks.

Chakrabarti R. Jacobsen S. B. Farkas J.

*A Combined Silicon, Magnesium and Calcium Isotopic Study of Bulk Meteorites and the Earth* [#2398]

We are currently measuring Si, Mg and Ca isotopes in the same samples of bulk meteorites and terrestrial rocks to understand the processes leading to differences in the isotopic compositions of undifferentiated meteorites and the bulk silicate Earth.

Wada K. Tanaka H. Suyama T. Kimura H. Yamamoto T.

*Numerical Simulation of Dust Aggregate Collisions: Compression and Disruption of BCCA Clusters* [#1545]

We carry out 3D simulations of dust aggregate collisions and examine their compression and disruption processes to reveal planetesimal formation. We obtain scaling laws on the processes and discuss the structural evolution of dust aggregates.

Fukui T. Tanaka H. Kuramoto K.

*A Possible Origin for the  $-3/2$  Power Law Distribution of Solids in the Solar Nebula* [#1557]

We suggest that the  $-3/2$  power law distribution of solids in the solar system would be simply reproduced by the radial drift of small dusts, which have a uniform threshold velocity for sticking about  $\sim 1$  m/s, in protoplanetary disks.

Oka A. Nakamoto T. Ikoma M. Ida S.

*Effects of Icy Particles on the Location of the Snowline in Protoplanetary Disks* [#2547]

We examined the evolution of the snowline in protoplanetary disks around T Tauri stars considering both silicate and icy dust particles as the opacity source. We found that the icy dust particles play an important role to determine the snowline.

Watanabe S. Lin D. N. C.

*Thermally Induced Waves in Irradiated Protoplanetary Disks* [#1127]

We calculate the quasi-static thermal evolution of irradiated protoplanetary disks by directly integrating the radial optical depth and find that in disks with modest mass accretion rates, thermal waves are spontaneously excited and propagate inward to small radii.

Minton D. A. Malhotra R.

*Secular Resonance Sweeping of Asteroids During the Late Heavy Bombardment* [#2481]

Using an analytical model of the sweeping  $\nu_6$  resonance and knowledge of the present day structure of the planets and main asteroid belt, we can place constraints on the rate of migration of Saturn, and hence a constraint on the duration of the LHB.

Takahashi K. T. Kobayashi H. K. Watanabe S.

*Formulation of Planetary Migration in Planetesimal Disk* [#1323]

Planetary migration by the interaction with planetesimal disk is investigated. We focus on the balance between mass flux around the planet and variation of angular momentum of planetesimals. We'll show a simple formula for the migration velocity of the planet.

Lisse C. M. Chen C. H. Wyatt M. C. Morlok A.

*Star System HD172555 — Spectral Evidence of Abundant Silica Created by a Massive In-System Collision?* [#2119]

The 12 m.y. system HD 172555 has large IR luminosity and an unusual mid-IR spectrum peaking at 9  $\mu\text{m}$ . The best spectral match is found for glassy silica. We hypothesize the silica, analogous to terrestrial shocked quartz grains, was created in a massive hypervelocity impact.

Srinivasan G.

*Al-Mg and K-Ca Isotopic Studies to Constrain Evolution of Primitive and Differentiated Planetesimals* [#2235]

Preliminary results for Mg and Ca isotopic composition of terrestrial standard and basalt standard are reported. These methods will be applied to determine the Mg and C isotopic composition of eucrites and primitive meteorite samples.