Thursday, March 20, 2003
EVOLUTION OF THE EARLY EARTH
1:30 p.m. Salon C

Chairs: T. Rushmer
M. J. Drake

Drake M. J. * Domanik K. Bailey E.
Vanadium, Cr, Si, and the Mg/Si Ratio of the Earth **[#1150]**
The relatively high abundances of V and Cr in the Earth's upper mantle indicate that the high Mg/Si ratio of the Earth's upper mantle cannot be attributed to extraction of Si into the core and must be an intrinsic bulk property of the silicate Earth.

Burbine T. H. * O'Brien K. M.
Determining Possible Building Blocks of the Earth **[#1193]**
To determine what material could possibly be the building blocks of the Earth, we have looked at hundreds of millions of possible combinations of different chondritic material to try to match the Earth's oxygen isotopic composition and its bulk chemistry.

Palme H. * O'Neill H. St. C. Benz W.
Evidence for Collisional Erosion of the Earth **[#1741]**
The Fe/Mg ratio of the bulk Earth is at least 10% higher than that of the average solar system, reflecting preferential removal of silicates from the Earth by large impacts on the growing Earth or on differentiated Earth forming planetesimals.

Jacobsen S. B. * Yin Q.
Hf-W, Accretion of the Earth, Core Formation and the Origin of the Moon **[#1913]**
The main stage of accretion of the Earth is completed in 10 Myr and the remaining growth must be effectively finished in another 20–40 m.y. The formation of the Moon, if by a giant impact, happened at ~ 25–30 m.y. subsequent to solar system formation.

Brandon A. D. *
The Osmium Isotopic Composition of Tagish Lake and Other Chondrites, Implications for Late Terrestrial Planetary Accretion **[#1776]**
Osmium isotopes and highly siderophile element concentrations were measured on Tagish Lake and other chondrites to assess whether these meteorites have the characteristics of potential late accretion materials on Earth and Mars.

Becker L. * Poreda R. J. Nuth J.
Fullerenes and the Nature of Planetary Gases **[#1482]**
We present evidence that suggests the Earth's atmosphere was supplied with noble gases from a fullerene component that was Xe-deficient. Subsequent mixing with "solar type gases" from the interior of the Earth ultimately produced the atmosphere that exists today.

Busemann H. * Baur H. Wieler R.
Solar Noble Gases in Enstatite Chondrites and Implications for the Formation of the Terrestrial Planets **[#1665]**
We report evidence for tiny amounts of — most likely primordial — noble gases with solar-like elemental and isotopic composition admixed to Q-type primordial noble gases in an E chondrite. We will discuss possible implications of this finding for terrestrial planet formation.

Genda H. * Abe Y.

Survival of a Protoatmosphere Through the Stage of Giant Impacts **[#1623]**

We examined the relation between the global ground motion exited by giant impact and the loss fraction of atmosphere. Unlike the previous studies, estimated loss fraction is <30%. It should affect the origin and evolution of planetary atmosphere.

Rushmer T. * Humayun M. Campbell A. J.

Siderophile Elements in Metal Segregated from Partially Molten Ordinary Chondrite: Implications for Early Differentiation Processes **[#1174]**

Siderophile elements have been measured in metallic liquid segregated from partially molten ordinary chondrite. Siderophile concentrations in quench metal are similar to natural IIE irons.

Holzheid A. * Balog P. Rubie D. C.

The Effect of Pressure on Sulfide Melt Distribution in Partially Molten Silicate Aggregates: Implications to Core Formation Scenarios for Terrestrial Planets **[#1367]**

The effect of pressure on the wetting behavior of sulfide melt in partially molten solid silicate matrices was studied. The sulfide melt distribution indicates possible interconnected liquid metal phases in a silicate matrix at higher pressures.

Watson H. C. * Fei Y. Watson E. B.

Diffusion of Siderophile Elements in Iron-Nickel Alloys at High Pressure and Temperature **[#1871]**

Experimental determination of diffusion coefficients for several siderophile elements (Au, Re, and Pd) at 10–20 GPa and up to 1600°C in 90 wt% Fe, 10 wt% Ni alloy.

Boyet M. * Rosing M. Blichert-Toft J. Storey M. Albarede F.

^{142}Nd Evidence for Early Earth Differentiation **[#1945]**

Evidence of a 30 ppm ^{142}Nd anomaly in three Greenland metabasalts is presented. The preferred interpretation draws on the formation of thick protocrust in the wake of core segregation.

Papanastassiou D. A. * Sharma M. Ngo H. H. Wasserburg G. J. Dymek R. F.

No ^{142}Nd Excess in the Early Archean Isua Gneiss IE 715-28 **[#1851]**

We have remeasured, with greatly improved precision, ^{142}Nd in an Archean Isua Gneiss and find no excess in ^{142}Nd, in contrast with an earlier report.