Goldschmidt 2000
September 3rd–8th, 2000
Oxford, UK.

Journal of Conference Abstracts
Volume 5(2), 141

Systematics for the Bulk Chemical Composition of the Earth Planet

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A meteorite data bank of relatively precise analysis has been compiled by Wasson & Kallemeyn. By normalizing to highly refractory elements, we can develop a set of element ratio diagrams both for moderately refractory, semi-volatile, and volatile elements. In all diagrams carbonaceous chondrites define a straight line, while ordinary chondrites do not plot on such line in many diagrams and define a different domain. The various carbonaceous chondrites plot on the same order regardless the element ratios considered.

By using the critical ratios like Al/Mg, K/U, Rb/Sr, I/U, we can show that Bulk Earth, but also Mars, and Eucrite parent body plot on the carbonaceous line. But the position of the Planet relative to the different carbonaceous chondrites plot in different positions depending on the volatility of the element considered. For each planetary bodies a different pattern occurred.

Using a volatility scale as determined through the carbonaceous chondrites systematics, we can compute for each planetary body a Bulk chemical composition regardless the volatility or the fact that element is buried into the core or not.

This systematics of the planetary composition can be explained by using the condensation sequence as established by Grossman and Larimer and for each planetary body a mean temperature of accretion can be determined. A systematics about temperature and redox situation in Solar Nebulae can be deduced from such systematics.