

An Isotope Geochemists Perspective on Planetary Differentiation and Evolution

A. Shahar

The differentiation of planetesimals occurred at high temperature, low pressure, varying oxygen fugacity and on bodies with varying compositions. As increasing knowledge points to the Earth and other terrestrial bodies being formed from already differentiated planetesimals it is essential that we understand what these planetesimals looked like in order to fully understand how the Earth and other terrestrial planets formed. To fully understand how stable isotopes can probe planetary differentiation and evolution, we have conducted piston cylinder and diamond anvil cell experiments, calculated theoretical fractionation factors, analyzed meteorite samples, and calculated the effects of volatilization on isotope ratios. We have begun by focusing on the major elements: Fe, Mg and Si. In this talk we will present these data and what they can teach us about the differentiation and evolution of planetesimals in the early Solar System.