12.002 Physics and Chemistry of the Earth and Terrestrial Planets
Fall 2008

Age of the Solar System (Patterson Paper)

Discussion of:

Age of Meteorites and the earth
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Lead Lead Dating. The reason why rations of lead change in one sample is due to the distribution of minerals and their accompanying initial parent concentration.

Patterson assumption 1: The age of meteorites are the same age of the earth. (weird meteorites of diverse origins have the same age of the Earth)
        Assumption 2: The weird meteorites have the same age as each other.

Crazy = assumption

Show Assumptions: Plot them on a line. The lines should have all the same slope. You need many data points in order to get a good line.

Why would you choose a differentiated body (silicate part) you get different initial amounts of Uranium (choose a eucrite due to increased concentration of Uranium – partial melting fractionates Uranium)

Vesta differentiated within the first 100 million years.

Extracted ReS from Canyon Diablo, extremely low Uranium abundant mineral. (mu – uranium abundance)

U^{4+}, U^{3+}, U^{5+}, U^{6+}
Pb^{2+}, Pb^{4+}
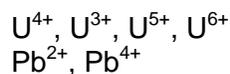
$Fe^{2+}S^{2-}$ So Uranium is too big. Doesn't fit, but lead does!

Now testing the theory that this age (that he got…4.55 billion years ago). Patterson got sediments from the bottom of the ocean and plotted them on the line. (small sample, would not really work today). Found zircons (in Australia) with ages up to 4.4 billion years ago.

For greater slop, t will be larger. The older it is, the bigger the slope.

The isochron (a line represents one age, the y intercept denotes the initial ratio).