Implications of Pb anomalies in meteorites for dating the age of stellar processes

KACEM ROCHD

The Chouaîb Doukkali University, El Jadida, Morocco
rochdkacem@yahoo.com

We report here that Pb anomalies in meteorites define a mixing line between s- and r-process nucleosynthesis components as determined from their corresponding stellar models on a standard 207Pb/204Pb vs. 206Pb/204Pb plot [1] [2]. Interestingly, we can use this mixing line as being representative of the initial conditions, together with U-Th-Pb systematics, for testing the stellar isotopic signatures of solar system objects, and then determine the age of stellar processes to which these stellar isotopic signatures are related in space and time. Following this approach, we find that the initial U/Th ratio of the solar system to be 0.576, which is similar to the stellar value of 0.578 as determined from the r-process calculations [3]. Consequently, we determine the age of the stellar process to which this initial U/Th ratio is related to be 7.7 Gyr.

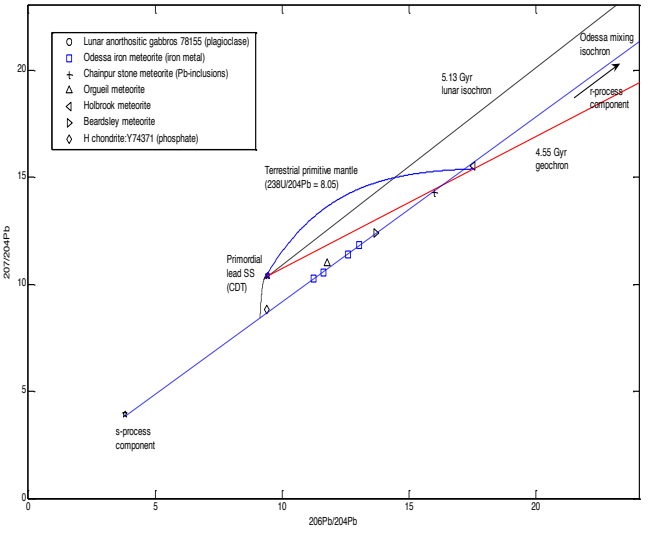

Figure 1: $^{206}Pb/^{204}Pb$ vs. $^{207}Pb/^{204}Pb$ plot of mixing line between s- and r-process nucleosynthesis components, and Pb anomalies of meteorites.

[1] Arlandini C *et al* (1999) *Astrophys J* **525**, 886-900. [2] Marshall & Feitknecht (1964) *Geochim Cosmochim Acta* **28**, 365-379. [3] Cowan *et al* (2002) *Astrophys J* **572**, 861-879.