

# 187Re-232Th-238U Nuclear Geo- and Cosmochronometry: A Dating Method For Planetary Science And Astronomy

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Nuclear geo- and cosmochronometry [1] is a new research field, tightly constrained by a coupled  $^{187}\text{Re}$ - $^{232}\text{Th}$ - $^{238}\text{U}$  systematics [2] and developed to bridge the gap between nuclear astrophysics and geochronology. It is based upon the discovery of terrestrial signatures from at least two rapid (r) neutron-capture element processes, which plot on the astrophysical model line of sudden nucleosynthesis [3]. It aims at dating rocks by means of radioactivity, which makes it a subfield of nuclear chemistry. Here, for the first time the new method is outlined within a scientific framework of cosmology, astronomy, meteoritics and nuclear physics. Constraints on  $^{187}\text{Re}$ - $^{232}\text{Th}$ - $^{238}\text{U}$  nuclear geo- and cosmochronometry imposed by this framework are discussed. For educational purposes, a comprehensive mind map is presented. Specific examples are given to explain the application of the new method in geo- and cosmochronology, geo- and cosmochemistry, cosmology and solar system science, nuclear theory, nuclear astrophysics or stellar archaeology.

[1] Roller (2015), *Goldschmidt Conference Abstr.* **25**, 2672. [2] Roller (2015), 78<sup>th</sup> Ann. Meeting Met. Soc., Abstr. #5041. [3] Burbidge *et al.* (1957) *Revs. Mod. Phys.* **29**, 547 – 650.