The ages of the giant Bayan Obo rare earth elements deposit in China

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Bayan Obo is the largest light rare earth elements (REE) deposit in the world and also a large Nb and iron deposit in China. Its genesis is highly debated [1-2]. The ore-forming age of the Bayan Obo deposit is controversial, which hinders the geologists to decipher its genesis in terms of geochronology. A huge number of geochronological work has been done in Bayan Obo using diverse kinds of dating methods, in order to constrain the events such as formation of the basement, carbonatite magmatism, ore-forming process and granitic magmatism. In this contribution, a comprehensive review on the geochronological data of Bayan Obo was conducted to construct the timing framework of Bayan Obo.

The basement formed at the peak of ~2.0 Ga, which was intruded by ~1.3 Ga carbonatite magmatism. The Bayan Obo deposit formed between 750-350 Ma by metasomatism of subduction released fluids with enriched Mg and Fe from the mantle peridotite by serpentinization and subsequently enriched with REE, Th, Nb from the carbonatite by fluxing [2]. The tectonic regime is coherent with the closure of the Palaeo-Asian Ocean. The granitic magmatism intruded in Bayan Obo at 243-294 Ma, which is ~55 Ma later than the youngest ore-forming stage [3].

[1] Yang *et al*. (2009) *Geochimica et Cosmochimica Acta* **73**(5): 1417-1435. [2] Ling *et al*. (2013) *Scientific Reports* **3**, 10.1038/ srep01776. [3] Ling *et al*. (2014) *Lithos* **190-191**, 430-439.