Rare Earth Element Deposits – aspects of their evaluation, diversity, geochemistry and genesis

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There has been a significant growth in exploration activity for rare earth element ("REE") deposits since the firming of prices began in 2003. Numerous deposits have been subject to detailed evaluation, though during this period only one new operation at Mt Weld, Western Australia has commenced production. One older operation at Mountain Pass, USA, re-opened in 2012 but, due to low rare earth prices, shut down in 2015. Chinese production dominates the world rare earth industry, accounting for approximately 85% of the world's annual production of ~110,000 tonnes, from numerous deposits in five provinces. It is reported that approximately 45,000 tonnes of Chinese production is illegal.

The talk at SMEDG will give an overview of various types of rare earth deposits including those hosted by carbonatite, alkali- intrusives and supergene material including heavy rare earth enriched examples.

In general, cut-off grades used to report resources for many REE deposits are unrealistically low and significantly less than those used by the only two recent Western operations. These cut-offs result from attaching notional values on the basis of available metal prices and unrealistically low costs associated with production and sales.

The Mt Weld deposit was put into production after a 30 year exploration history and was only successfully drilled after 1991 once the regolith that hosts the mineralisation had been de-watered. This enabled the recovery of samples that had not suffered from the loss of fines. Its first reported resource estimates in 2002 achieved close reconciliations within a few percent of actual mined material.

[1] H&S Consultants Pty Ltd, Eastwood, NSW 2122, Australia. Based on a paper originally published with Rob Duncan in: Applied Earth Science (Trans. Inst. Min. Metall. B) 2014 vol 123 No 2, 2014. See link below for article: http://www.tandfonline.com/doi/full/10.1179/1743275814Y.0000000054 and see link below for permissions: http://www.tandfonline.com/doi/abs/10.1179/1743275814Y.0000000054?tab=permissions&scroll=top

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