



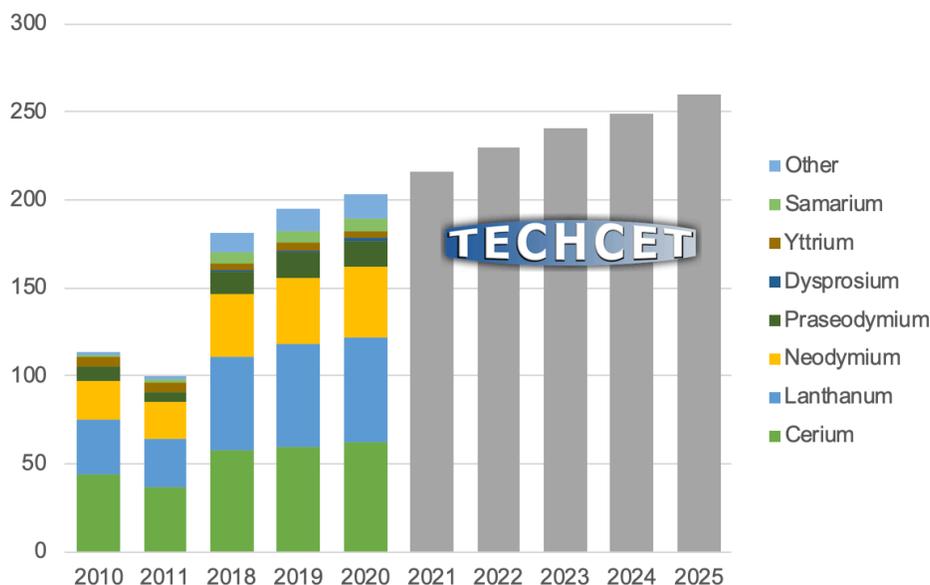
Electronics Materials Information

## Rare Earth Elements Supply Uncertain for IC Fabs

*China's de facto monopoly control remains for now*

**San Diego, CA, July 29, 2020:** TEHCET—the electronic materials advisory firm providing business and technology information—announces supply-chain challenges ahead for Rare Earth Elements (REE) for semiconductor device manufacturing, due to ongoing global pandemics and trade-wars. The United States is fast-tracking domestic REE refining capability to provide a global alternative to China's current de facto monopoly, but it could be 2022 or later before new capacity is available. The global supply of Rare Earth Oxides (REO) is expected to see a Compound Annual Growth Rate (CAGR) of 4.0% per year over the period 2018-2025, as shown in the figure from TEHCET's 2020 Rare Earths Supply-Chain Report (*below*).

**Global Rare Earth Oxide (REO) Production  
KiloTons**



"Although China is the global market leader for Rare Earth metals, they do not control all the mining in the world," commented Terry Francis, TEHCET Analyst and author of the report. "By specializing in the difficult refining and separation processes, Chinese companies have maintained a near-monopoly on rare earth metals production. They own most off-take from global mines such that they ship over 83% of the world's pure rare earth metals."

TEHCET is tracking three new REE refining operations in the U.S.:

- Lynas Corporation of Australia and Blue Line Corporation in Texas were awarded grants in late July 2020 by the U.S. government to develop a processing plant to extract rare earths from material sent from Malaysia.

- MP Materials will go public in 4Q20 on the New York Stock Exchange at a valuation of US\$1.47B where it will trade as "MP." The company plans to invest US\$489M in refining capacity in Mountain Top, California. In April 2020, the U.S. Department of Defense awarded MP a grant to pay for the design of a heavy REE separation facility.
- USA Rare Earth and Texas Mineral Resources started a heavy and light REE refining pilot plant in Wheat Ridge Colorado last December. It is working on a full-scale refinery for REE, lithium and other technology metals in Round Top, Texas.

U.S. refineries are not expected to be capable of volume supply until 2022 or later. In the meantime, China's REE companies will control the market. China's government recently announced a 6.6% increase in quota limits on exported volumes for 2020 over 2019. This is good news for REE buyers, but for new suppliers in the U.S. and Australia it likely means that market pricing will not follow traditional supply-demand trends. Pricing is likely to be highly variable, with possibilities of spikes in the spot market.

Another important market factor is that the handling of rare earth waste is challenging. Countries that are considering local refining capabilities must mitigate environmental risks. For example, USA Rare Earths recently announced their intention to rely on renewable energy for all of their power requirements as one way to balance environmental impacts. TECHCET anticipates more announcements inside and outside of China will be made over the next year addressing environmental concerns.

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