Dysprosium – The Most Critical Magnet Metal Could Threaten the EV Industry

written by Jack Lifton | March 3, 2023

Dysprosium, it's more critical than ever and just as scarce as ever.

On October 18, 2011, *eleven years ago*, I wrote the following email reply to an inquiry about the future of the non-Chinese OEM automotive industry's then new dependence on critical materials for EVs:

> *"I am at the moment in Shanghai where I have given an invited presentation to the Society of Automotive Engineers' (SAE) 2nd Hybrid and Electric Vehicle Conference. My topic was Critical and Strategic Metals for Electric Propulsion. I will be speaking and moderating a panel at the SAE World Congress in Detroit on April 25, 2012, on "Strategic and Critical Metals and Materials for a 21st Century Global OEM Automotive Industry." In each case the most critical metal of all is the rare earth element dysprosium, without which the modern automotive powertrain would lack the ability to have reliable stable electric motors and generators "under the hood" where dysprosium-modified neodymium-boron-magnets provide high coercivity (magnetic field strength) maintenance through repeat cycles of heating and cooling, and, also, the miniaturization of the automobiles power options, power steering, and a variety of motor management sensors."*

Dysprosium – one of the most critical of all metals

The OEM automotive industry today uses most of the approximately 1000 metric tonnes of dysprosium produced yearly today and produced exclusively in China. The growth of the OEM automotive industry in sheer numbers of vehicles produced plus the anticipated introduction of more and more electric vehicles with large electric traction motors of the rare earth permanent magnet type, already in use across the board in the Toyota Prius and all of its competitors of all types, Plug-in hybrid electric vehicles ("PHEVs") as well as electric vehicles ("EVs"), has, in my opinion, already created a dysprosium shortfall that has alarmed the automakers.

The US Dept of Energy agrees that dysprosium is one of the most critical of all metals for the continued health and competitive advantage of the non-Chinese car industry, I have repeatedly said that if no non-Chinese sources of dysprosium come into production by 2015 then the non-Chinese OEM automotive industry will cease to be competitive with that of China in internal combustion powertrain performance and will certainly lose out in the EV market."

Now, eleven years later, I am going to discuss this same topic, "Is there a dysprosium supply crisis?," at a June 8 meeting of the Detroit section of the Society of Automotive Engineers. Whoever first said that changes in the OEM automotive industry take a long time was right.

Critical Minerals Institute Summit

The broader theme of Critical Materials for EVs will be a focus of the Critical Minerals Institute Summit in Toronto on June 14 and 15.

This problem, the supply of critical minerals for the transformation and use of non-fossil fuel energy production and storage is existential.