# Lifton on Liberating Global Markets from Chinese Dependence

nonApril 20, 2016 — In a special interview, InvestorIntel speaks with technology metals advisor Jack Lifton, about his insights on Ucore's SuperLig®-One rare earth separation pilot plant and its implications for the future of tech metals processing. Jack explains how SuperLig® technology make Ucore **"the company to beat"** in the non-Chinese tech metals refining space. Jack also touches on the broad capabilities of the technology to separate not only the rare earth elements (REE's, rare earths), but cleantech metals such as lithium, cobalt, tungsten, and many more. He qualifies the scale of the opportunity as global: "I'm sure that it won't be very long before there are these types of plants operated by your company around the world. Where the feed stock is, quite frankly, available in — from India, southeast Asia, Africa, South America and North America and Australia. In other words, the entire world."

Excerpt from interview with Jack Lifton: "This pilot plan puts the U.S. and the rest of the non-Chinese world back on the scoreboard because what we have here is for the first time a new, much more efficient, more economic system of producing very high purity technology materials, metals and materials. And the reason the Chinese have dominated this field for so long is because they have the entire supply chain. And so we can, quite frankly, dig all the holes we want. It doesn't do any good because we can't process material.

What this brings back to the market, American, domestic, whatever you want to call it, is the ability to be competitive. And so companies here, for example, that don't want to make products with technology metals and materials because the only source is foreign and typically China and they can't get them except at the behest of the Chinese, now they have an option. They have an alternative. And I guarantee you this is going to create a great deal of investment in high tech because high tech is based on technology, metals and materials and that's what you're going to be producing.

At the moment there is no other place in the world outside of China that is capable of producing heavy rare earth metals in high purity form or midrange metals for that matter, rare earths. So you're adding value to the entire technology world outside of China. We're never going to be competitive unless people like you bring businesses like this into existence…to access the complete interview, click here

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# Lifton on coining 'Technology Metals'

***Technology Metals Monday*** – Starting today, I will on every Monday, review the highlights of the previous week in technology "metals and materials" for those investors, both small and institutional, who wish to know what is affecting the future demand growth for such metals and materials.

***Technology Metals and Materials*** are the chemical elements (metals and metalloids: metal-like elements, and their alloys and compounds), ***the electronic properties of which enable technologies to be mass produced.*** Thus "Technology Metals" are critical for the lifestyle of contemporary industrialized societies and the desire for such a lifestyle is the true driver for future global demand growth for technology metals

The reader may think that I am being far too precise and therefore constricting in the above definitions, but I believe that the provision of and the securing of food, shelter, health, and safety are the only reasons that society in general and the division of labor in particular came into existence. The democratization of society and most importantly the growth of a stable middle economic class is the key driver for the spread of consumer versions of technology that deliver anything beyond food, shelter, health, and safety.

I originated the use of the term “technology metals” in 2007 when I thought I needed a category term to describe those rare metals that were not used structurally (i.e., they could not be used to support weight or resist deformation without losing their properties) or useful in making tools (they could not hold an edge or be sharpened). Thus until the advent of a distributed and regular affordable supply of electricity (1880s) and an understanding of alloy chemistry (1900- ) rare metals were at best decorative and thus either monetized (gold and silver) or unknown. The scientific revolution of the $19^{th}$ century driven by the recognition of a structure within matter (atoms and molecules) and then by the careful taking of data and the recognition of patterns inherent in the data led to the advent and then the rapid development of scientific chemistry and then of scientific metallurgy.

I did not originally include as a technology metal Copper, probably the first metal discovered by man, and I did not in 2007 see that copper became the first and still is today ***the*** core technology metal,. This is because it is the cheapest way to distribute electricity. Copper was thus the first, and remains the most important of the, technology metals.

**The key technology metals** can be listed in many ways. In 2007 I listed them by the technologies they enabled:

- Energy production, storage and distribution: Uranium, Zirconium, Hafnium, Uranium, Molybdenum, Cobalt, Nickel, Beryllium, Neodymium, Praseodymium, Dysprosium, Terbium, Scandium, Lithium, Sulfur, selenium, tellurium, cadmium
- Communication: Silicon, germanium, gallium, indium, arsenic, antimony, neodymium, praseodymium, dysprosium,
- Information management: Silicon, germanium, gallium, arsenic, antimony, phosphorous, carbon (as graphene and graphite)
- Entertainment: Indium, yttrium, europium, terbium
- Transportation: Chromium, manganese, tungsten, molybdenum, yttrium, zirconium, nickel, cobalt,
- Infrastructure: Niobium, Chromium, Manganese, Cobalt, Nickel, Tungsten, Molybdenum, Vanadium
- Chemical reactions, Catalysts: Platinum, Palladium, Ruthenium, Rhodium, Molybdenum, Silver, Cerium, Lanthanum
- Health: Heavy Rare Earths, Platinum group metals, Thallium, Phosphorous
- Security: Uranium, Tungsten, Molybdenum, Chromium, Nickel, Cobalt, the Rare Earths,

Most of the rare key technology metals appear several times in the above technology categories. Nearly all of them are scarce, or only found as by-products of “base” metals production, and, even in that case, are difficult to extract and/or separate and refine to the high purities needed for technological application.

Therefore the world of technology metals supply has entered into a new phase. Exploration for additional supplies of minerals from which rare technology metals may be extracted is no longer necessary. What is now critical is the development first of extraction technologies to recover the rare technology metals from their ores, and simultaneously the application of known technologies for separating and purifying more common metals and materials to the problems inherent in separating and purifying rare technology metals. Second is the development of new separation and purification technologies for use with the rare technology metals.

In all cases, extraction, separation, and purification existing and new technologies for each must be economical and practical. Laboratory demonstrations must be followed by scale-up to pilot plants before any investor can be asked to commit to the construction of a full scale facility.

The current rare earth boom-let began as a pure exploration play in 2007 with all participants assuming that if a mixed concentrate of the rare earths of any distribution of proportions could be produced then "they" would buy it and refine it by "traditional" methods. This has turned out not to be, and it never was, the case.

Just a few of the exploration companies have survived with a business model revised to take into consideration just how far along the supply chain the processing of rare earths must go to achieve a profitable product line for sale. Even fewer of those have managed to achieve a clean (radiation free, interfering ion free) mixed concentrate process-able by the "traditional" method of solvent extraction as practiced today in China, France, Japan, Malaysia, and California into individual rare earth salts of commercially high purity.

There are now perhaps four new rare earth separation/purification technologies at the bench scale level in test. Two of the four have been applied at scale to the separation and purification of other rare technology metals. Both of these will now be tried at the pilot plant scale in 2015. The remaining two technologies have never been tried at pilot plant scale but show great promise.

I will be reporting on this latest phase, the processing phase, of the development of supplies of individual separated rare earths as well as on similar situations and developments in the lithium, platinum group metals, and graphite spaces.

Demand will not create new supplies unless both existing and new process technologies can be brought to bear on the minerals we know.

It is innovation that must be supplied as well as money.

The need for such innovation has already seen the birth of many new specialist processing companies in the USA and Europe.

Next week I'll tell you about the ones looking at the rare earths.