

Russia returns to the global REE scene with new processing technology

☒ Scientists at Russia's Ural Federal University have developed a method to extract rare earths from uranium mines. The new technology will be tested over the next three years as researchers believe that it could reduce the demand for rare earth imports in Russia by a third. The new process can be applied to most uranium mining operations and could, by extension, be applied worldwide. The newly developed method involves the injection of sulfuric acid into the soil, which dissolves uranium and rare earth metals. The revolutionary thing about this process is that the sorbent can allow for the selective extraction of uranium, rare earth metals or scandium, without affecting the quality of the uranium. The Russians have been working specifically on the sorbent. Researchers hope to develop the complicated technology so that it can be used in industry and beyond the extraction of rare earth metals, but also for the production of the whole range of their concentrates in the form of oxides and compositions, metals, alloys and finished products.

Today, China controls 97 percent of rare earth metals (REE) exports and efforts by such companies as Lynas Corp (ASX: LYC) and Molycorp (NYSE: MCP) have not had significant impact on reducing the world's reliance on Chinese rare earths. Often, the People's Republic was suspected of exploiting its quasi-monopoly and to manipulate prices and it was formally asked by the World Trade Organization to abide by international trade rules in response to American, European and Japanese accusations of unfair trade practices. Russia is one of the countries that has identified rare earths resources that could be extracted to compete with China but its production is still limited at about 100 tons – there are ongoing efforts to

increase this – out of an estimated annual production of 120,000 tons worldwide. Until the 1970's, the Soviet Union was the undisputed world leader in this field. However, a new Russian developed technology could enable Russia to quickly ramp up REE production in the coming years to 1,000 tons annually.

Ural Federal University believes its new technology will play a very important role in helping Russia replace Chinese imports of REE raw materials and finished products. The Russian government and a private Moscow energy firm (ZAO Energetitscheskie Projekty) have contributed about USD\$ 18 million toward testing and developing the new process. Russia developed REE's in the 1970's to advance its aerospace and military technology. It was the first country to use scandium – an element that is very similar to REE's – to develop stronger alloys. Scandium, when added to aluminum, increases the resulting alloy's strength and durability by 50% (almost twice as strong as aluminum series 6061 or 7005), in turn allowing for the use of less material to achieve the desired characteristics, translating to less weight. Interest in the mining of rare earth metals in Russia for a long time was low. This new development along with the IST group's joint venture with the state-owned Rostekh (planning to invest at least a billion dollars, by 2018, to exploit of an area of about 250 square kilometers in the Yacuzia region in to extract 154 million tons of minerals containing yttrium, niobium, scandium and terbium) are putting Russia back on the trail of the former Soviet Union's rare earths leadership. The new technology will make REE processing more efficient and it can certainly be exported – geopolitical and military considerations aside.

Russia can use the new technology to produce rare earth metals and scandium for the defense industry, the radio electronics, equipment manufacturing, nuclear engineering, mechanical engineering, chemical industry and metallurgy, including

metals, oxides, phosphors, magnets and other applications. The Russian defense industry has so far kept very close watch, but Western European electronics manufacturers have also expressed high interest in the hopes of reducing their reliance on Chinese imports especially where neodymium is concerned, which is used in the electronics industry and in mechanical engineering.