Stony Brook University

GEOLOGY OPEN NIGHT

CRITICAL MINERALS AND THE WEALTH OF NATIONS

DR. JOHN PARISE

Distinguished Professor, Department of Geosciences

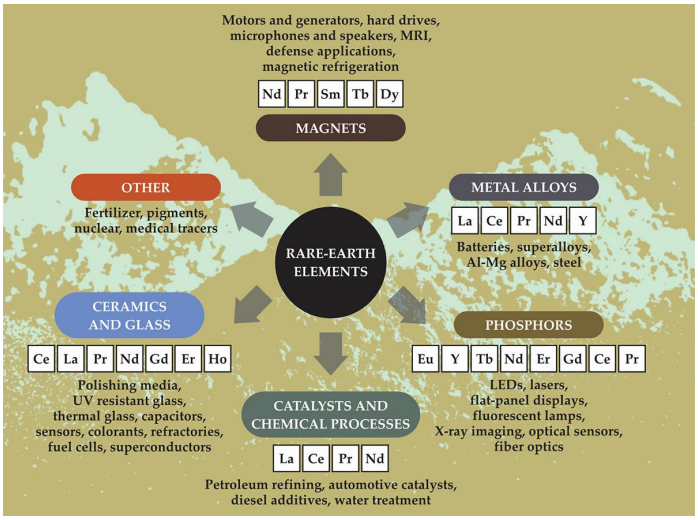

Diagram taken from: J. Zhou & GA Fiete, Rare earths in a nutshell, *Physics Today* 73, 66–67 (2020)

October 24, 7:30pm, Earth & Space Sciences 001

According to the USGS "A critical mineral is one that is important for specialized applications yet is at risk for supply disruption". Rare Earth Elements (REEs) fit this definition. They are essential components that underpin technologies important to advanced energy systems and national security, for example. Their uneven global distribution, concentration of production in a few countries, and environmentally intensive extraction processes pose significant geopolitical and sustainability challenges. Research and policy efforts increasingly focus on diversifying supply sources through geological exploration, substitution, and circular economy (recycling) approaches. Securing resilient and sustainable access to REEs is the challenge of our time. Such challenges are not without precedence in human history, where we see that from the stone age to the present, technological innovation has depended critically on mineralogical research.

John is a mineralogical crystallographer and Solid-State Chemist. His research interests intersect mineralogy, mineral properties, and the properties of novel materials inspired by naturally occurring crystalline solids. His recent interests include the manipulation of solution chemistry to separate important minerals and elements. Professor Parise joined the Department in 1989. He was attracted to Stony Brook by the prospect of the synthesis of unique materials at high pressure, following the installation of Instrumentation in the new Stony Brook High-Pressure Laboratory, an initiative led by Geoscience's Professors Weidner and Liebermann. These unique facilities were soon expanded to be interfaced to the Light Source at nearby BNL. John has participated in several multi-investigator multi-institution initiatives led by Stony Brook PIs, including the NSF's Center for High Pressure Research (1991-2002), and Center for Environmental Molecular Sciences (2007-14). He is current Director of the DOE's Next GENeration SynthESIS Center (GENESIS) and of Stony Brook's Joint Photon Sciences Institute. He has mentored over 50 graduate students and postdocs, has published ~420 papers and holds 4 patents.