**OIM2 SYMPOSIUM**
Talk Abstract Submission

*Complete all fields marked with an asterisk (*).*

**Talk Title** *

*Strategic advanced materials*

**Authors (underline the presenting/speaking author)** *

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## ABSTRACT

*Maximum 300 words, you can add figures to your abstract.*

*In an era of trade wars, supply chain disruptions, and geopolitical tensions, securing access to raw materials for next-generation technologies has become a urgent challenge. Under the criticality framework, a 'critical' raw material is one defined by a high economic importance combined with a high supply risk, with a subset denoted as 'strategic' when a raw material is essential for green, digital, defence, and space technologies. However, technological breakthroughs are increasingly driven by advanced materials, but it is not yet known how to extend such assessments to this vast and rapidly expanding family of materials. In this work, we introduce a scalable self-reliance index that quantifies European autonomy not only for all elements but also for compounds and devices.*

*We then link the self-reliance scores of a comprehensive range of nanomaterials to their state-of-the-art performance across conductors, semiconductors, dielectrics, battery electrodes, and photovoltaic layers, finding in almost all cases that high performance materials based on heavily imported elements have European-sourced substitutes with comparable performance. To harmonise advanced materials with the raw material criticality framework, we propose an operational definition of a 'strategic advanced material' as one characterised by high technological performance in next-generation technologies that is achieved through locally available inputs. This framework is intentionally simple and is intended as a first draft of what a strategic designation for advanced materials could look like. Developing this into a truly useful and universal selection tool requires opening conversations with actors at all TRLs, which is the goal of this talk.*

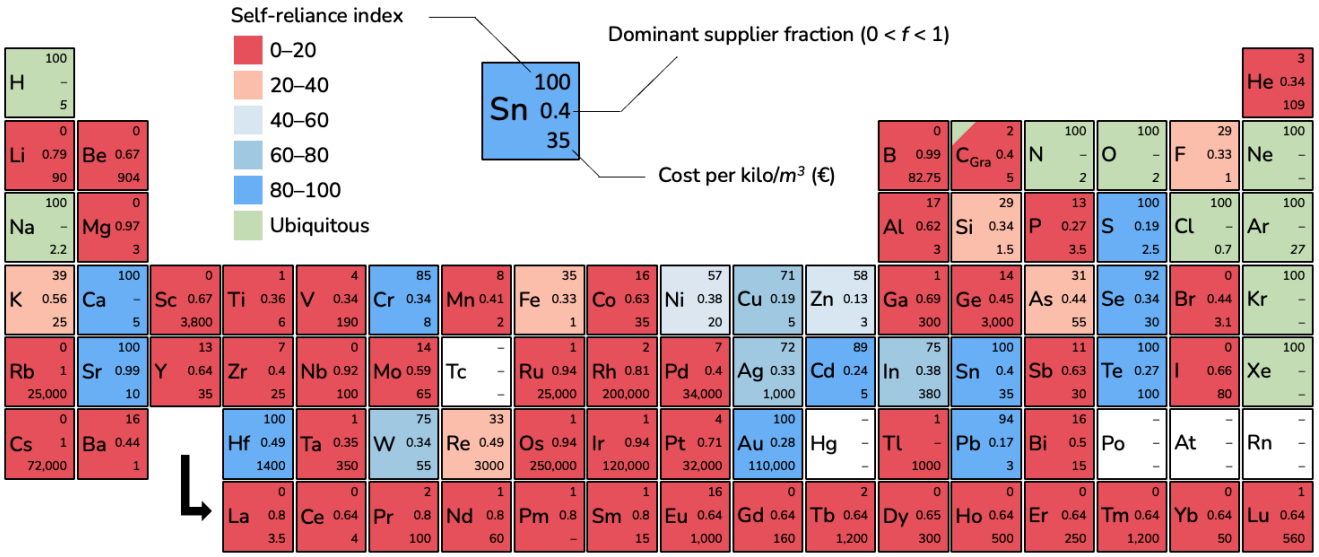



Figure 1 | **The periodic table**. We visualise the self-reliance index, dominant supplier fraction, and approximate cost of each element. Carbon is calculated using import reliance and recycling data for natural graphite (noting that elemental carbon is considered ubiquitous), fluorine using fluorspar, and potassium using potash

**Keywords** *

*Criticality, raw materials, advanced materials, strategic, self-reliance*

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