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Critical Raw Materials: Is it possible for supply to meet demand?

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The term “critical” is applied if a material is of high demand and is difficult to source[1,2]. Every country requires a slightly different mix of materials, depending on what its industrial activities require. The underlying geology of a country coupled with ability to process materials domestically will determine how easily materials can be sourced without relying on others.

History shows us that the demand for raw materials has been the underlying cause of many a conflict. We cannot change the geology, but we can improve our understanding of the rocks and our ability to extract and process what we need from them. We can also change how we design our technology so that we don’t need so much of a material, especially if the demand for it has the potential to trigger conflict or environmental harm. We can extend the life of our infrastructure, cars, phones by building them so that parts that wear out can be more easily replaced, and we can improve our ability to recycle and keep materials in circulation.

These changes can not only reduce our demand for certain materials, but can also help to ensure that where materials occur naturally in the ground, they are seen as an opportunity for those who live on top of them, rather than a curse.

The people who hold the key to many of these improvements are geochemists. We need policy setters, financiers, innovators and others to support us, but it is our expertise and understanding that can make Earth’s natural resources available in a more equitable manner to a broader range of people.

1. Mudd, G et al. (2024) UK 2024 criticality assessment https://www.ukcmic.org/reports/cmic.html

2. Nassar, N et al. (2025) Methodology and technical input for the 2025 U.S. List of Critical Minerals—Assessing the potential effects of mineral commodity supply chain disruptions on the U.S. economy https://www.usgs.gov/publications/methodology-and-technical-input-2025-us-list-critical-minerals-assessing-potential