
Commonwealth Chemistry

COP26 Statement on Sustainability and Critical Raw Materials

By adopting the United Nation's Sustainable Development Goals and signing the Paris agreement on climate action, the countries of the Commonwealth have committed to tackling the dual challenge of moving towards sustainable consumption and production patterns¹ and reducing emissions of long-lived greenhouse gases in the short-term². Low-carbon technologies and solutions that enable greater energy and resource efficiency will play a pivotal role in these efforts³.

Critical Raw Materials (CRMs) are materials that are of strategic importance to an economy and that, at the same time, have a high risk linked to their supply⁴. While CRMs are heavily relied upon by the energy, healthcare, aerospace, information communication technology (ITC) and consumer electronics sectors, they are crucially also at the core of many of the technologies that will enable us to cut our emissions and decarbonise our economies⁵.

CRMs that are vital for low-carbon technologies include the rare earth metals dysprosium and neodymium in the permanent magnets of wind turbine generators; gallium, indium and tellurium in the photovoltaic cells that form the heart of solar panels; and lithium, nickel and cobalt in energy storage solutions such as the lithium-ion cells used in electric vehicle (EV) batteries⁵.

Global demand for CRMs is likely to rise dramatically over the coming decades, putting great pressure on the supply side⁵. A large proportion of these CRMs are extracted and processed to concentrates in low- and middle-income countries⁶ but are beneficiated in high income countries to high purity materials which are then used in high-value products that are often not readily affordable to residents of those countries where the raw materials come from. The beneficiation of ores of CRMs in countries where they are mined, would greatly benefit the economies of the low-and middle-income countries and improve the affordability of finished products, from CRMs, in those countries.

Greater reuse of CRMs will help meet the increased demand and reduce reliance on new extraction of CRMs. In turn, limiting extraction of virgin CRMs – while potentially resulting in significant revenue loss for the affected countries – will also reduce the environmental cost associated with mining and refining the materials⁷.

This transition towards a sustainable circular economy for CRMs will be underpinned by the development and deployment of at-scale technologies that enable CRM recovery from 'urban mines'; recycling of end-of-life solar panels, wind turbines and EV batteries; and replacement of CRMs with more earth-abundant materials⁵.

¹ [Sustainable Development Goal 12](#): Ensure sustainable consumption and production patterns, United Nations Department of Economic and Social Affairs, 2015.

² [Paris Agreement](#), United Nations Framework Convention on Climate Change, 2015.

³ [Position Statement on Climate Change](#), Royal Society of Chemistry, 2021.

⁴ [What are Critical Raw Materials?](#), British Geological Survey, 2021

⁵ [Decarbonisation: materials and circularity challenges for clean technologies](#), RSC Environment, Sustainability and Energy Division, 2021.

⁶ [Study on the EU's list of Critical Raw Materials](#), European Commission, 2020.

⁷ [Elements in Danger](#), Royal Society of Chemistry campaign, 2019.

The chemical sciences will be key – alongside other disciplines – to all of these efforts. For example, chemistry research is critical in the development of more sustainable pyro- and hydrometallurgical separation techniques to recover CRMs from waste; scalable approaches to EV battery recycling; and circular product design⁴. Chemical scientists also collaborate internationally and across disciplines to optimise EV batteries and large stationary energy storage solutions for solar-powered microgrids that can be deployed in remote rural areas across the world to run water pumps, ICT systems and lighting in schools⁸.

There is an opportunity for chemical scientists across the Commonwealth to address the challenges posed by climate change and the current global reliance on CRMs, both by developing innovative localised solutions that address environmental concerns and energy needs, and by contributing to a greener, more circular global economy.

November 2021

⁸ [Batteries for the sustainable development goals](#), Royal Society of Chemistry expert panel, 2021.