



COVID-19 and Critical Raw Material Supplies needed for Health Care

The Impact of COVID-19 on Critical Raw Material Supplies needed for the Healthcare and Possible Mitigation Actions

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- **Challenge** - Enormous sudden demand in medical face masks in the health industry and public worldwide led to extreme shortage of medical supplies (*German Ministry of Health* BMG ordered 1 billion face masks).
- **Problem** - Suppliers concentrated mainly in Asia (China) → shutdown of producing factories → massive shortage in medical supplies. Medical supply that did reach the endusers were partly flawed; ca. 20% of all facial masks were defect.
- **Solution** – *German Ministry of Health* (BMG) requested TÜV NORD/DMT in 2020 to sample test medical face masks 24/7.
- **Mitigation** – TÜV NORD/DMT/BASF open medical supply test laboratory in China (Shanghai, Guangdong). European clothing outfitters industry started producing medical face masks.

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- Most EU CRMs are used in health care (except Hafnium and Tungsten):

Deployment from CRMs in Health Care								
CRM	Medication	Medical technology	CRM	Medication	Medical technology	CRM	Medication	Medical technology
Antimony	X		Hafnium	no use		Phosphorus	X	
Baryte	X	X	HREEs	X	X	Scandium	X	X
Beryllium		X	Indium		X	Silicon Metal	X	
Bismuth	X		LREEs	X	X	Tantalum	X	
Borates	X		Magnesium	X		Tungsten	no use	
Cobalt	X		Natural Graphite		X	Vanadium	X	
Coking Coal	X		Natural Rubber		X	Bauxite	X	
Fluorspar	X		Niobium	X		Lithium	X	
Gallium	X	X	PGMs	X	X	Titanium		X
Germanium		X	Phosphate rock	X		Strontium	X	

SOURCE - European list of CRMs (European Commission, 2020) and their usage for the healthcare sector

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CRMs required for medical health care (selected examples)

- **Lopinavir** (HIV and HPV anti-viral) contains mineral-based silica, talc, titanium, iron.
- **Remdesivir** (Ebola anti-viral) contains phosphate, calcium, silica, magnesium, titanium.
- **Xofigo** (breast and prostate cancer treatment of bone metastases) contains **Ra-223** (4 doses of 50 kBq/kg every 4 weeks) through extraction from Ra-226-bearing phosphogypsum tailings worldwide.
- **REE (Er, Ho, Lu and Y)** – X-ray tubes, magnetic resonance imaging contrast media, nuclear medical imaging, applications in cancer treatment and genetic screening tests, and medical and dental lasers.
- Example **Lu-177** – used worldwide for treatment of cancer in soft tissue, such as nerve and hormone producing cells.

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Lessons learned & implications on policy recommendations for food-water-energy resource management:

- Criteria for CRM supply for health care (but also green energy technology): **Develop independent CRM supply** (e.g. by State-driven investments in CRM projects in-/outside of Europe, e.g. ERMA).
- Criteria for sustainable raw materials → Recommendation: Develop **audit catalogue and certification scheme** for sustainable raw materials (e.g. CERA 4in1).
- Water resources management in Eastern and Southeastern Europe with potential to implement **water management practices of large mining projects** (e.g. water quality monitoring, recycling of process water, fossil groundwater policy, strict water remediation requirements etc.)

Thank you!

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