

Metrology for the recycling of Technology Critical Elements to support Europe's circular economy agenda



Bundesanstalt für
Materialforschung
und -prüfung

Johanna Noireaux¹, Jochen Vogl², Giancarlo D'Agostino³, Sarah Hill⁴, Regine Gendre⁵, Oktay Cankur⁶, Jean-Philippe Ghestem⁷, Conny Haraldson⁸, Johanna Irrgeher⁹, Radojko Jacimovic¹⁰, Aida Jotanovic¹¹, Timo Sara-Aho¹², Daniel Proefrock¹³, Olaf Rienitz¹⁴, Gisela Umbricht¹⁵ contact: jochen.vogl@bam.de



Problem

Lack of knowledge about TCE stocks and flows in urban mines. TCE analysis is hindered by extreme heterogeneity of the waste and a lack of suitable CRMs. Analytical procedures providing SI traceable results are not available.

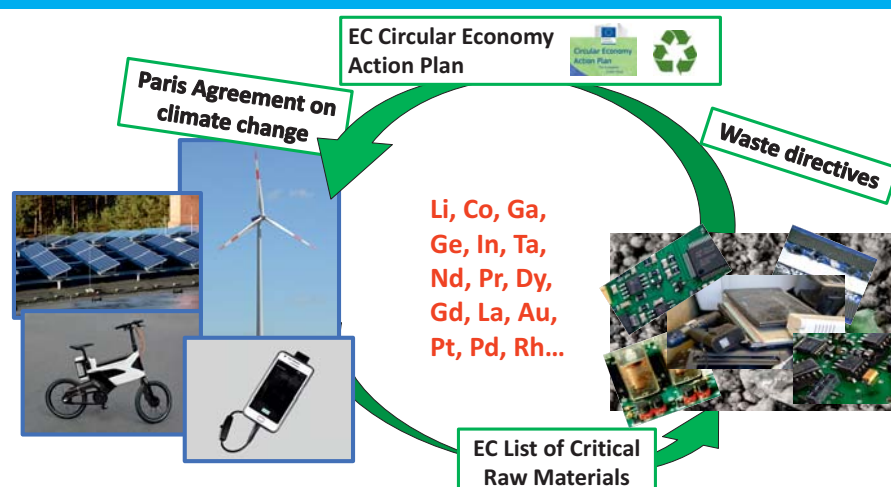


Solution

To enable comparability of analytical results and thus finally allow the improved recycling procedures, sampling strategies, analytical procedures, enabling SI traceable values and CRMs for TCE to be developed.

Current situation

Technology critical elements (TCE) are key materials for high-tech products such as smartphones, notebooks and monitors. Their demand is expected to increase exponentially due to the shift towards greener economy through the deployment of renewable energy and electro mobility solutions (European Green Deal). This and the lack of TCE production within the EU, puts the market under pressure and leads to increasing prices. The need to secure TCE supply has become even more pressing under the current health crisis.

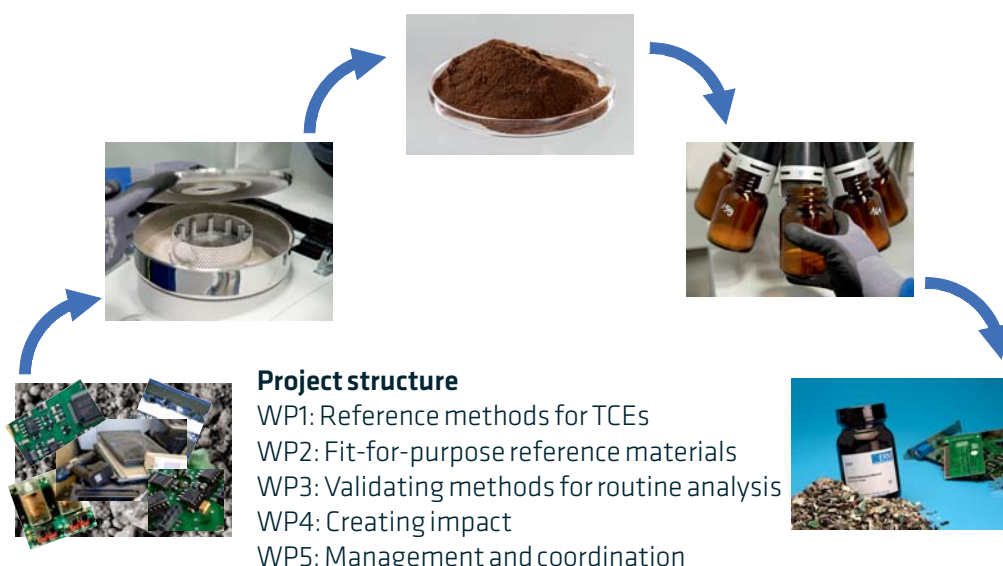


Securing TCE supply is a major objective of the Covid-19 Recovery Plan aimed at reinforcing Europe's resilience and autonomy. A sustainable solution is effective recycling and finally a circular economy. However, the analysis of waste streams is difficult and requires suitable SI traceable analytical solutions to allow for comparability of measurement results throughout the recycling process. Calibration standards and certified reference materials (CRMs) enabling SI traceable results, however, are lacking.

Challenges, work plan & aims

Challenges

- the raw materials from urban mining are extremely heterogenous
- guidelines for sampling an urban mine dump are not available
- standards for sample preparation are not available
- calibration standards enabling SI traceability are lacking for many TCEs
- reference procedures for the quantification of TCEs in different waste materials are not available
- certified matrix reference materials are lacking for calibration but also for quality control



Work plan and aims

- guide on representative sampling
- developing reference methods for the quantification of Li, Ga, Ge, Pd, Nd & Pt based on isotope dilution mass spectrometry (IDMS)
- developing reference methods for the quantification of Co, Rh, In, Ta, Pr, Dy, Gd, La & Au
- preparation of 3 CRMs (batteries, LEDs, printed circuit boards)
- investigating routine analytical methods for TCE quantification
- conducting an interlaboratory comparison for industrial labs
- providing training to partners and stakeholders

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Partner



Sicherheit in Technik und Chemie