NATIONAL INSTITUTE OF STANDARDS AND TECHNOLOGY
U.S. DEPARTMENT OF COMMERCE

Black Mass Grading/Classification: Project Update

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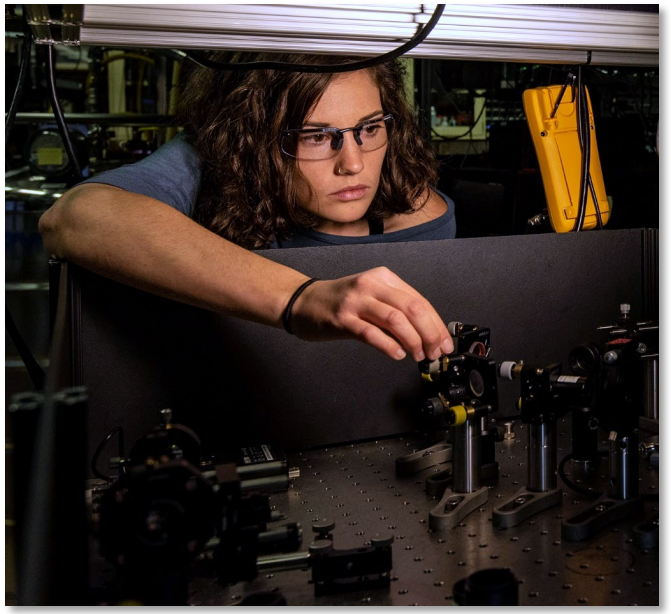
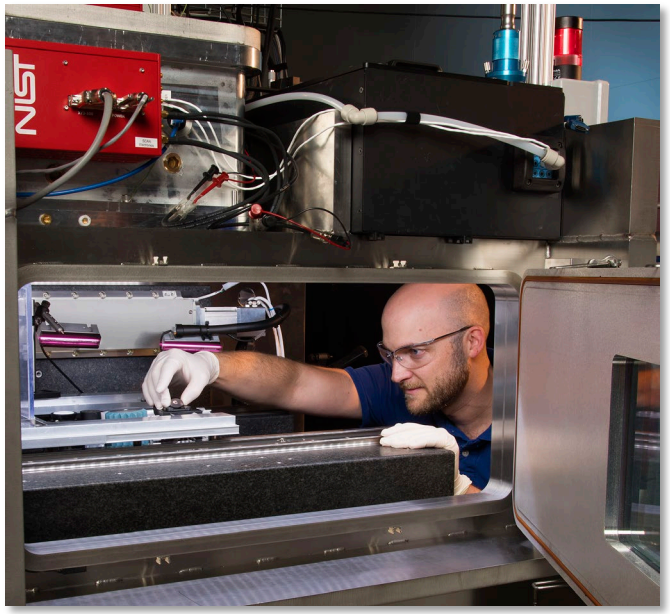
Material Measurement Laboratory

Mission Statement

To promote U.S. innovation and industrial competitiveness by advancing **measurement science**, **standards**, and **technology** in ways that enhance economic security and improve our quality of life



World-Leading Scientific and Engineering Research

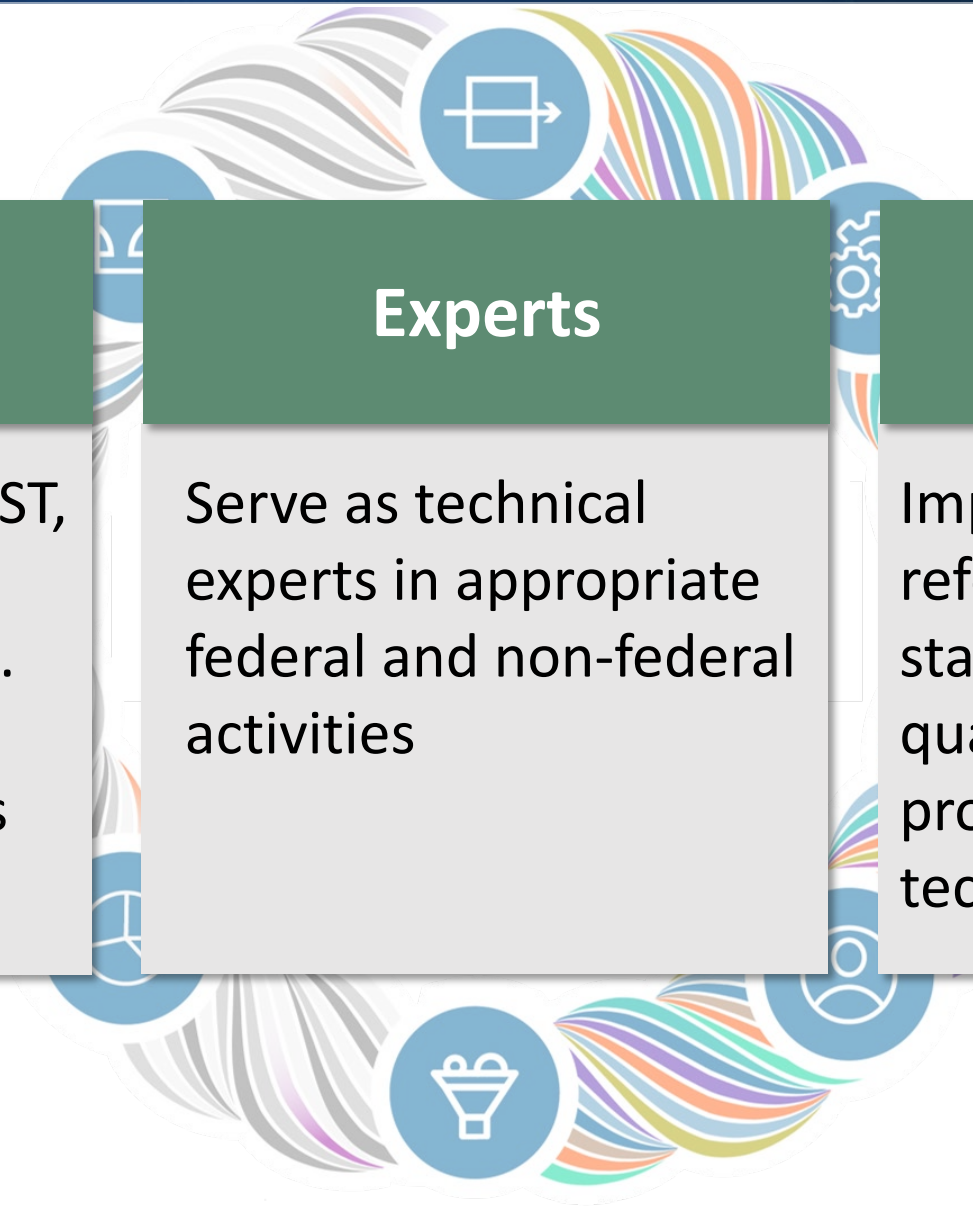


Advanced Manufacturing National Programs

Technology Dissemination and Standards for U.S. Innovation

NIST's Role

NIST MATERIAL MEASUREMENT LABORATORY

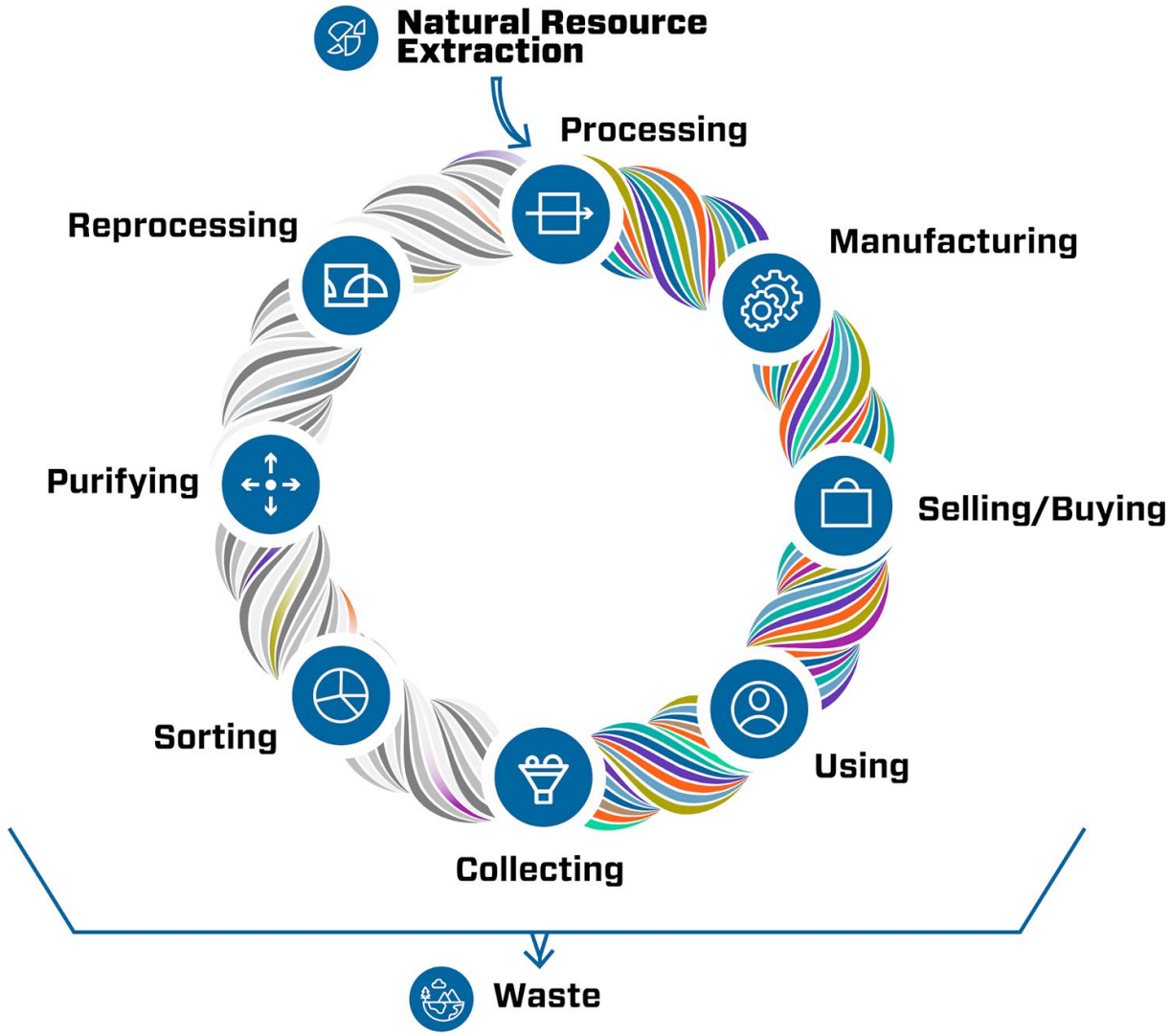


Convenor	Experts	Public servants
Engagement across NIST, other government agencies, industry, etc. to foster high-impact, cross-cutting solutions	Serve as technical experts in appropriate federal and non-federal activities	Improve measurements, reference data, and standards needed to quantify and assess processes and technologies

Circular Economy at NIST

Aiming to keep atoms and molecules in the economy, producing value

- Plastics
- Electronics
- **Batteries**
- Textiles
- Concrete
- Metals
- Food waste
- Manufacturing



Different Approaches to Black Mass

Country	***Classification***
U.S.	(Solid) Waste or Hazardous Waste
EU	Hazardous Waste
China	Hazardous Waste, unless otherwise specified*
South Korea	Recyclable Resource**
India	Hazardous Waste

FLASH: China introduces national standard for battery black mass

Source: Mysteel Jan 09, 2025 02:54

Recycled Battery Materials | Policy

RÉPUBLIQUE FRANÇAISE
Liberté Égalité Fraternité

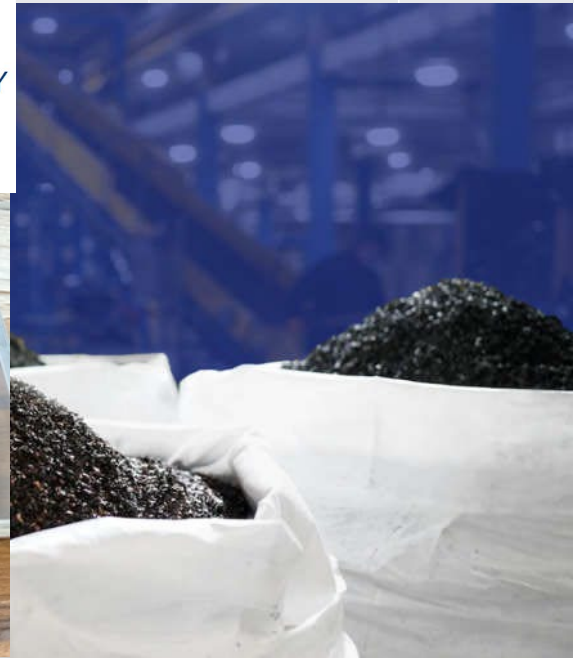
LABORATOIRE NATIONAL DE MÉTROLOGIE ET D'ESSAIS

EURAMET SUPPLEMENTARY COMPARISON 2160 ON TECHNOLOGY CRITICAL ELEMENTS IN LITHIUM BATTERY

JOHANNA NOIREAUX, PAOLA FISICARO

CCQM IAWG Paris meeting 23-24 April 2024

Element	Expected mass fraction on a dry mass basis	Description
Li	(0.5 -20) 10^4 mg/kg	Strategic element
Co	(0.5 -20) 10^4 mg/kg	Strategic element
Ni	(0.5 -20) 10^4 mg/kg	Strategic element
Cu	(0.5 -20) 10^4 mg/kg	Strategic element



Goal

To understand stakeholders' perspectives and requirements regarding the development of a standardized definition and classification or grading system for black mass in the U.S.

Conducted between 2023 and 2025:

- Focus groups:
  - Private and public stakeholders (FCAB)
- One-on-one discussions
- Large group, open discussions

Open-ended questions, voluntary responses.

Why a Consensus Process?

NIST MATERIAL MEASUREMENT LABORATORY

Clear base *definitions*, developed through a *voluntary process* via collaboration between public and private sectors, promote economic growth and fair trade.

They foster a shared understanding of specific products and ease communication friction within a market.

Consensus-defined terms[1]:

- Enables consistency, coherence
- Supports concept development
- Inhibits deviances
- Promotes harmonization
- Serves as a reference
- Stimulates trust

Further categorize materials based on::

- Product size
- Content
- Quality

Inform interested parties about the extent to which a standard has been met:

Goal: Reduce barriers to commerce

1. Adapted from Galinski and Weissinger, "Terminology Standardization and Translation Standards", *Congrès Mondial*, 2008

Insights Gained

NIST MATERIAL MEASUREMENT LABORATORY

Lack of consensus on a definition for Black Mass (BM)

- Highlighted the challenges of establishing a universally accepted definition for BM

Concerns about regulatory/market implications

- Expression that standardization could increase regulations or impose market limitations

Importance of sampling and testing

- Current practices vary across companies
- Could be considered part of a company's IP
- Mismatch in practices may cause confusion

Sentiments about a classification/grading system

- May improve safety, efficiency, and cost reduction (?)
- Hesitant to pursue this formally, opting to observe the evolution of existing systems instead

Request for further discussion and education, but no workshop

- Waste classification, export/import regulations, and standards development activities

Next Steps

Standards landscape survey and identify a path for industry-focused education

Focus on measurement needs for the U.S. stakeholders:

- Benchmarking data/methods to use in comparisons
- Emphasis on manufacturing/industrial utility

Continue to engage with both stakeholder groups and monitor changes to commerce/trade activities

Participate in select Standards Development Organizations

Thank you to:
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Kelsea Schumacher
Christina Gore
Leah Kauffman
NIST Research Library and
Standards Coordination Office

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Thank you for listening!

Questions?

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Battery Research at NIST

100+ years of experience in battery research/standards:

> "… verification of electrical standards and electrical measurement devices" (1903, *Science*, FA Wolff Jr)

NIST's recent battery efforts have focused on:

- Measurement Science and Metrology Research
- Material Track and Trace Methodology
- Process Engineering Methodology
- Safety and Security
- Documentary and Physical Standards

Produced ≈100 peer-reviewed publications and reports since 2014

Work supports private (industry, consumers) and public (DOE, DOD) stakeholders