BASC

Battery Association
for Supply Chain

LIB Black Mass Classification

Revision History

Revision History	Contents	remarks
2025.10.1	Create 1st version	

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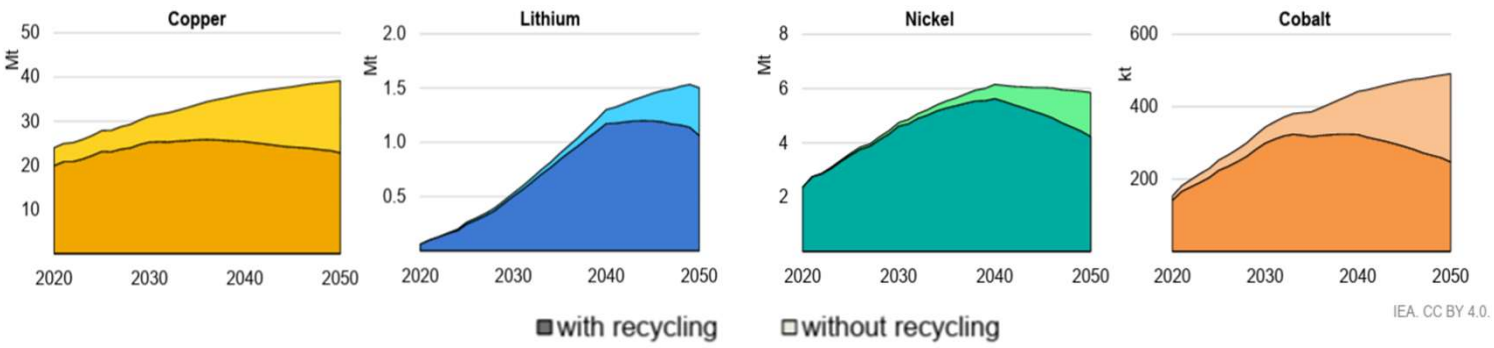
Importance of LIB Recycling

Demand for LIB batteries is growing rapidly, with the expansion of EVs as the primary reason. Accompanying this growth, the demand for LIBs and the critical minerals contained in LIBs is also expanding.

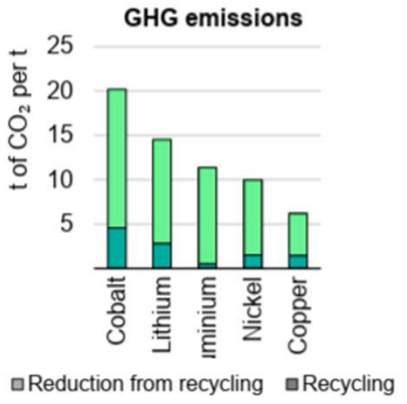
According to the IEA's Recycling of Critical Minerals report, recycled materials are expected to account for 20-40% of the resource supply in 2050. The report also states that the use of recycled materials will contribute to the reduction of GHG emissions and other environmental burdens.

While recycling is important for resource supply and environmental impact reduction, the LIB recycling market is still immature, and the market needs to be developed to create a more efficient LIB recycling ecosystem.

Prospects for procurement of secondary resources through recycling



Reduction of GHG emissions through recycling

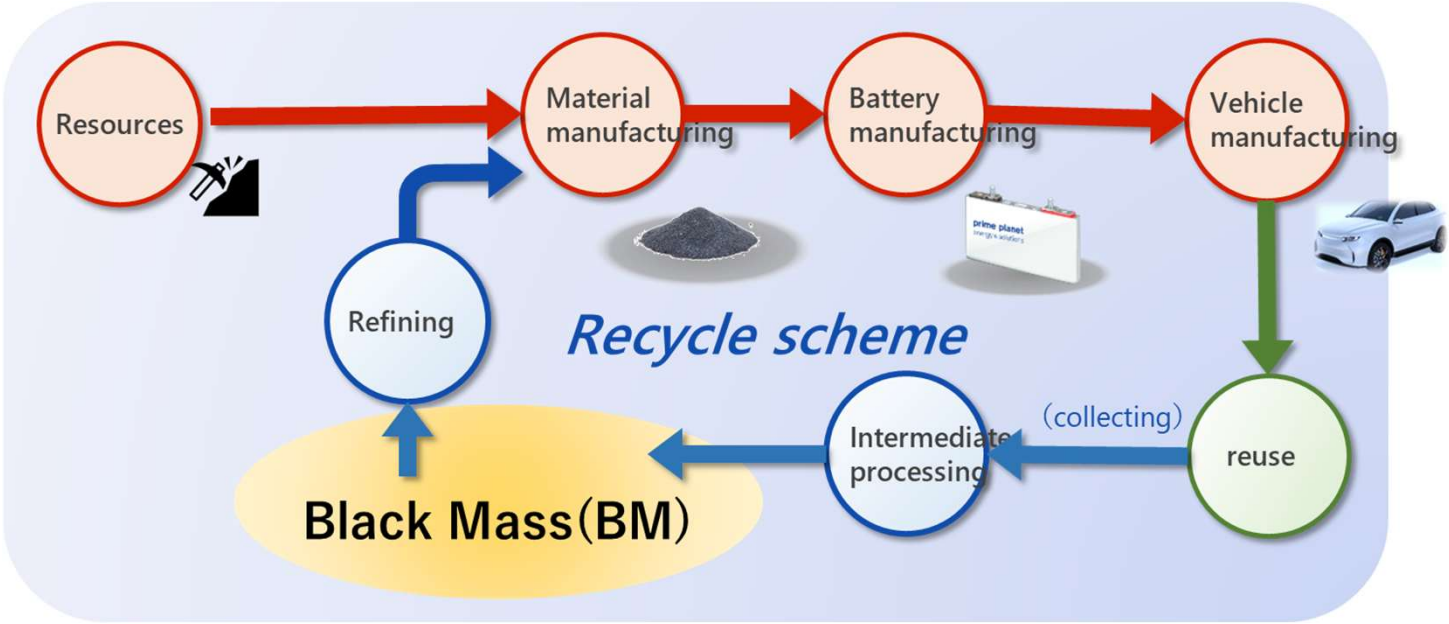


(Source) IEA "Recycling of Critical Minerals" (2024/11)

LIB recycling process

The figure below shows the LIB production and recycling ecosystem. After waste batteries are collected, they undergo crushing, sieving, and other processes to produce battery powder called black mass, which contains rare metals such as Ni, Co, and Li. This black mass is refined and recycled as battery raw materials such as nickel sulfate.

Black mass is one key material that affects the efficiency of recycling.



Purpose of the Black Mass Classification

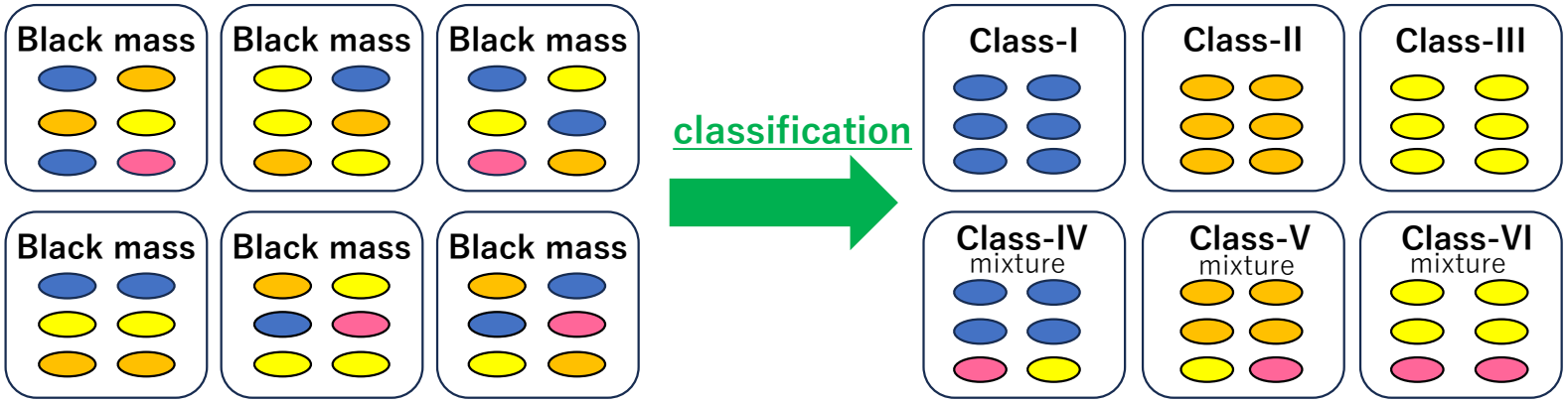
There are various types of LIBs, and black mass may contain multiple elements. Proper separation of black mass will reduce the burden of impurity removal in the refining process, resulting in lower recycling costs.

In order to promote separation, a black mass classification table was developed as a guideline, which we believe will contribute to the creation of a more efficient LIB recycling ecosystem and the promotion of LIB recycling.

Specifically, the following three effects can be expected depending on this classification.

(1) Improved communication efficiency through the use of a common language
(2) Promoting the availability of black mass suitable for each recycling process
(3) Reduction of unnecessary regulatory compliance

Image of effect by classification



Black Mass Classification

Black Mass Classification

		Origin		
		a	b	c
CLASS	I	CLASS I - a	CLASS I - b	CLASS I - c
	II	CLASS II - a	CLASS II - b	CLASS II - c
	III	CLASS III - a	CLASS III - b	CLASS III - c
	IV	CLASS IV- a	CLASS IV- b	CLASS IV- c
	V	CLASS V - a	CLASS V - b	CLASS V - c
	VI	CLASS VI - a	CLASS VI - b	CLASS VI - c

How to read the Black Mass Classification Table

CLASS I - a

Classification by Composition

Classification by sources and production process

Classification of Black Mass by Composition

Category	Ni, Co amount		remarks
CLASS I	Co＜Ni	Ni+Co conc. ： ≥ 10%	Fe : ＜ 2%, to satisfiy RoHS
CLASS II	Ni＜Co	Ni+Co conc. ： ≥ 10%	
CLASS III	No Ni,Co	Ni+Co conc. ： ＜ 10%	to satisfiy RoHS
CLASS IV	Co＜Ni	Ni+Co conc. ： ≥ 10%	
CLASS V	Ni＜Co	Ni+Co conc. ： ≥ 10%	
CLASS VI	No Ni,Co	Ni+Co conc. ： ＜ 10%	

All categories of BM include more than 2% of Li.
Concentrations of all elements shall be counted without water contents.

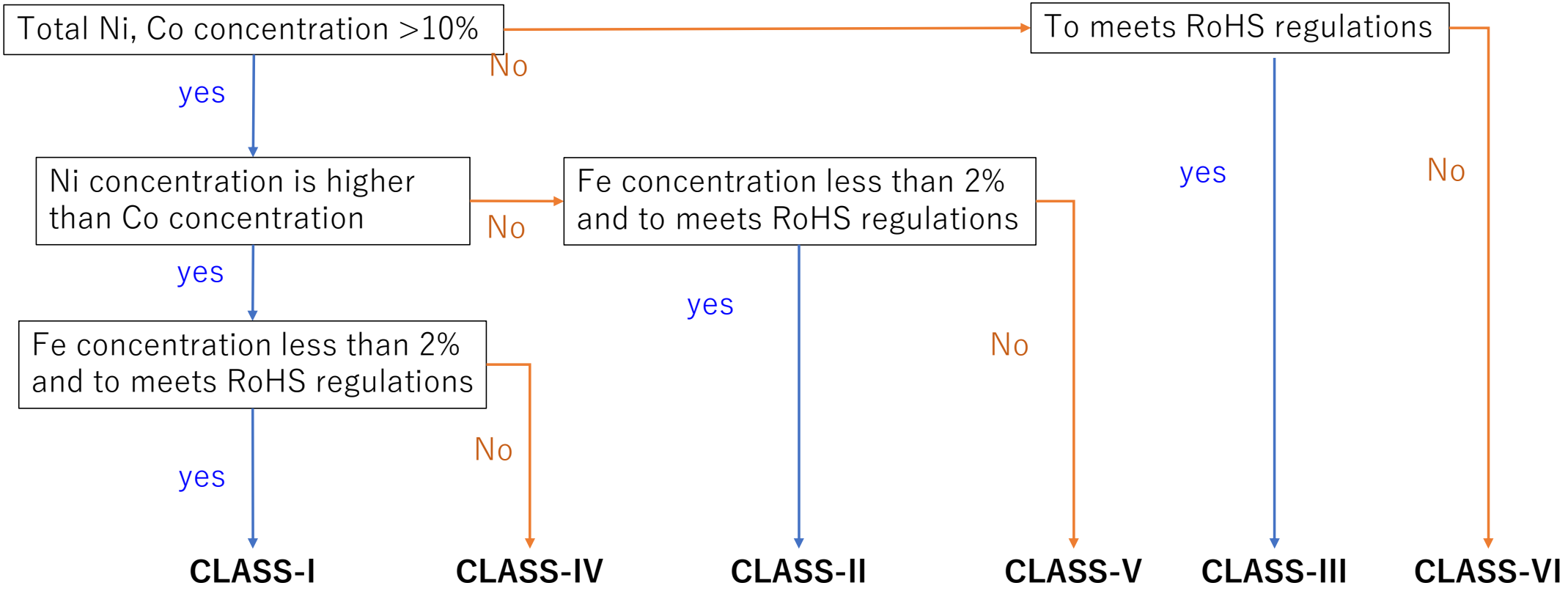
Classification of black mass by sources and production process

Origin-a	Origin-b	Origin-c
positive electrode*	cell, module,pack without calcination	cell, module,pack with calcination

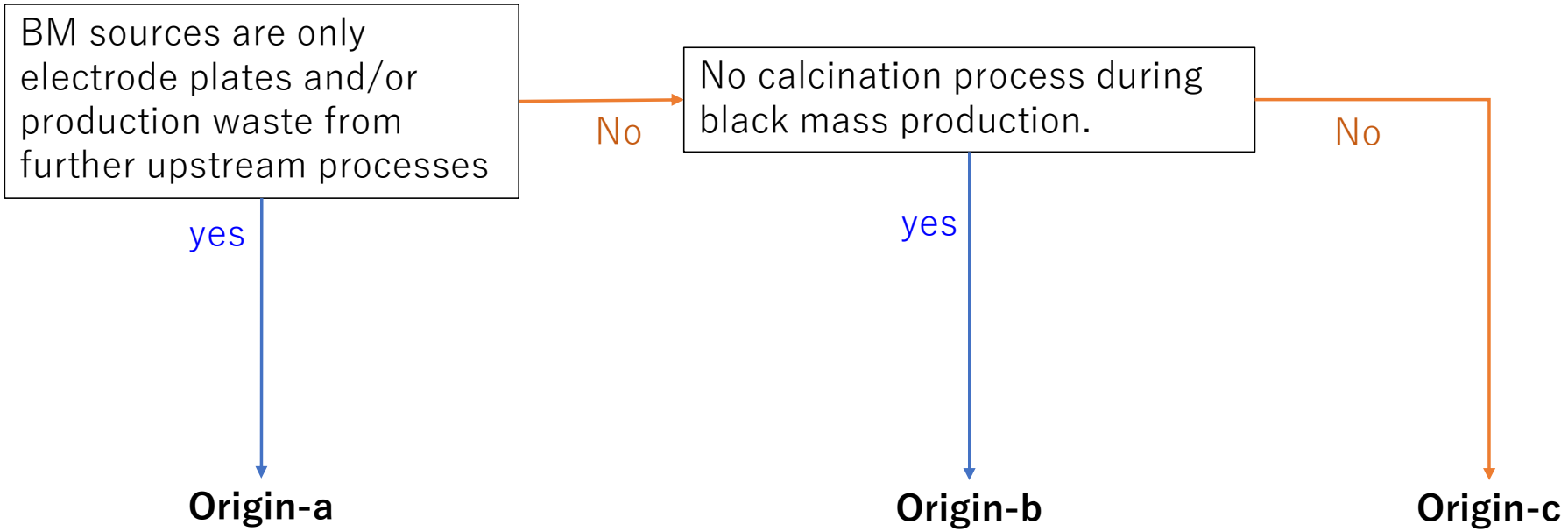
*including production scrap in the manufacturing process and upstream process.

- Black mass is classified according to (1) composition, (2) sources and production process, and then classified as a combination of them.
- Black mass derived from LIBs and with a Li concentration greater than 2% is considered for this classification.
- The composition of black mass is determined by its concentration excluding water.

(Reference) BM Classification -Classification by Composition -



(Reference)BM Classification
- Classification by production method -



Conclusion

- We sincerely hope that this black mass classification as a guideline will contribute to the development of a more efficient LIB recycling eco-system and the promotion of LIB recycling.
- We plan to continue revising this classification through constructive dialogue with all relevant stakeholders, not limited BASC members, in order to make it more user-friendly.