

Life Cycle Inventory Analysis of CO₂ emission from Copper Products Manufacturing System in Japan

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Outline

1. Objective of this study

- More effective to reduce the CO₂ emission?

2. Modeling conditions

- Inventory for producing the electrolytic copper
- Inventory for manufacturing the copper products

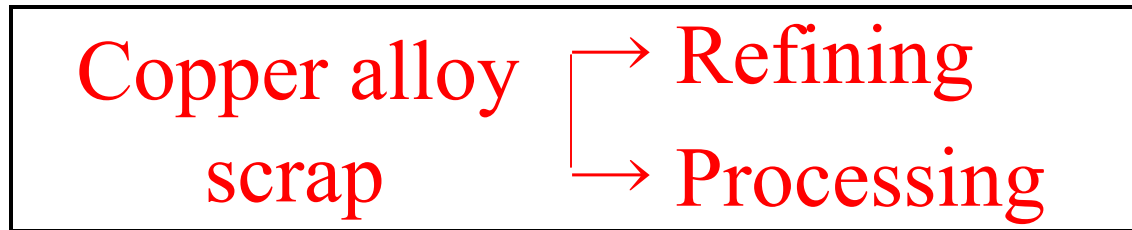
3. Result of LCI on electrolytic copper.

4. Result of LCI on copper products.

5. Conclusion

Objective and scope

To estimate the reduction effects of CO₂ emission
by recycling the wastes resources
to the copper production system in Japan.



Functional unit

Copper products and sulfuric acid as co-products
(The amounts of produced sulfuric acid
depends on the manner to use the scrap.)

System boundaries of this study

From mining the ore and the other resources
in domestic and foreign countries
To manufacturing the copper products
via electrolytic copper in Japan

How to get Inventory data?

- (1) From statistics compiled by government
Yearbook of non-ferrous metals 1998
The structural survey of energy consumption
- (2) From the published paper
(For mining and dressing: survey of Chile)

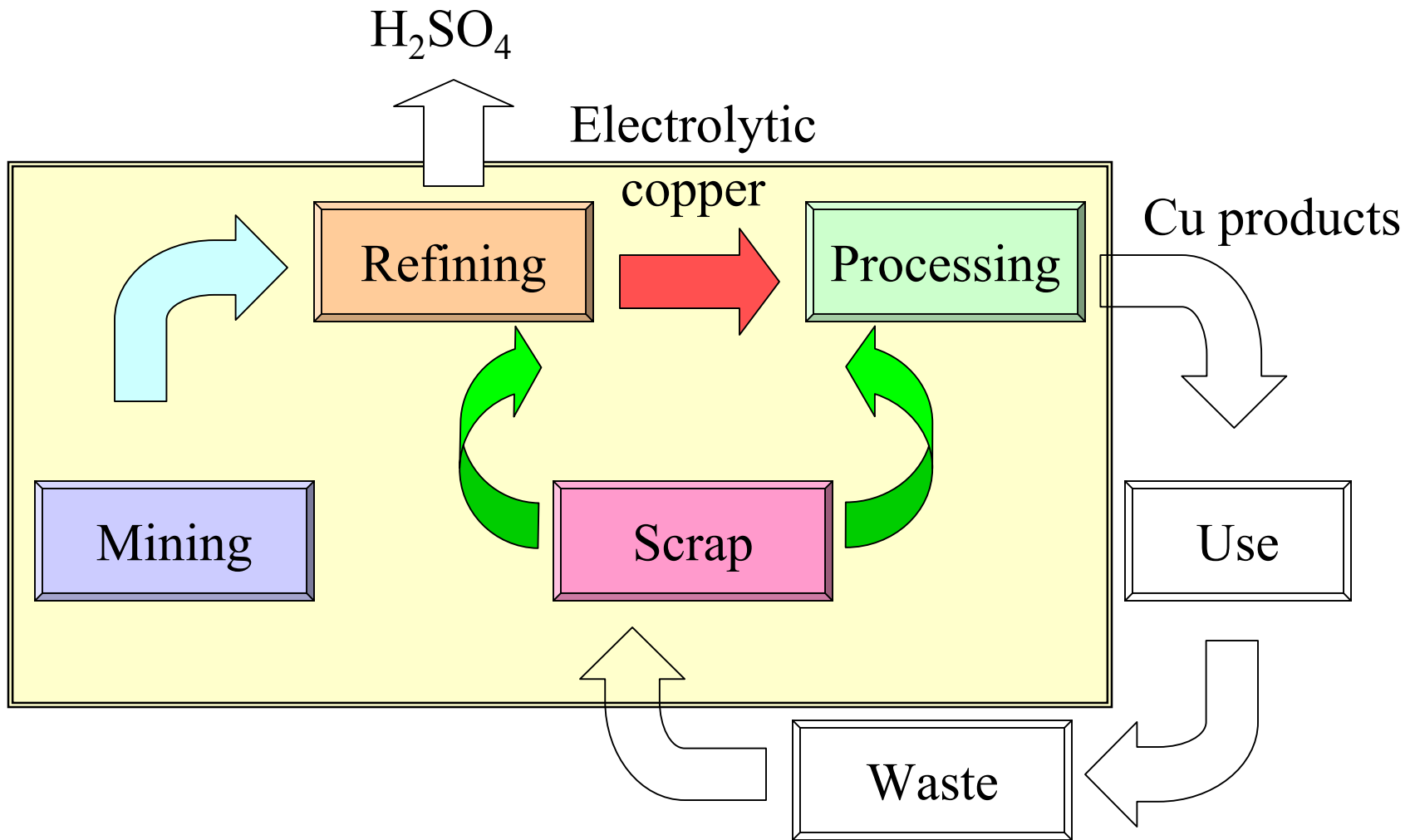


Fig. System boundary and the concepts in this study.

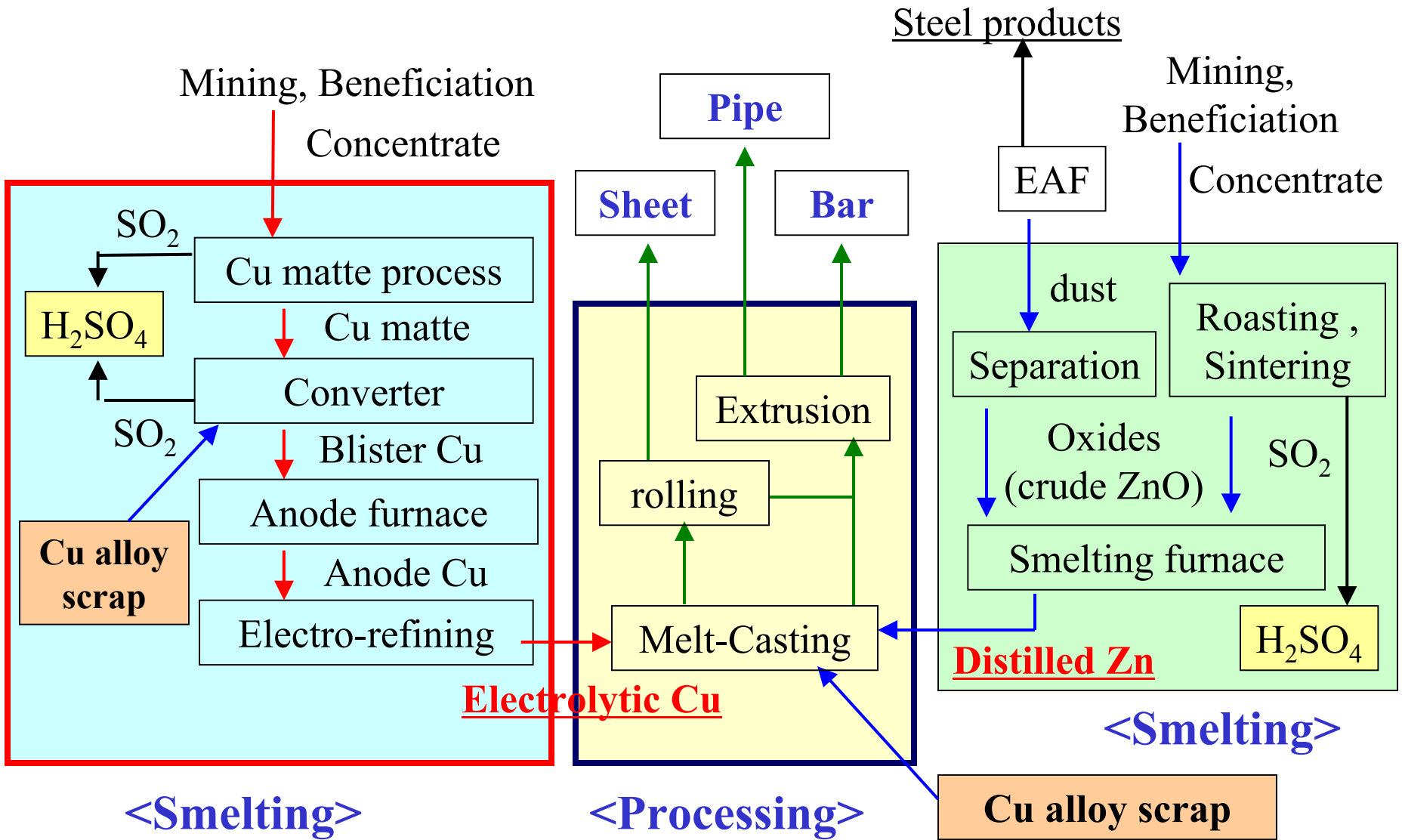


Fig. Material flow for producing brass products.

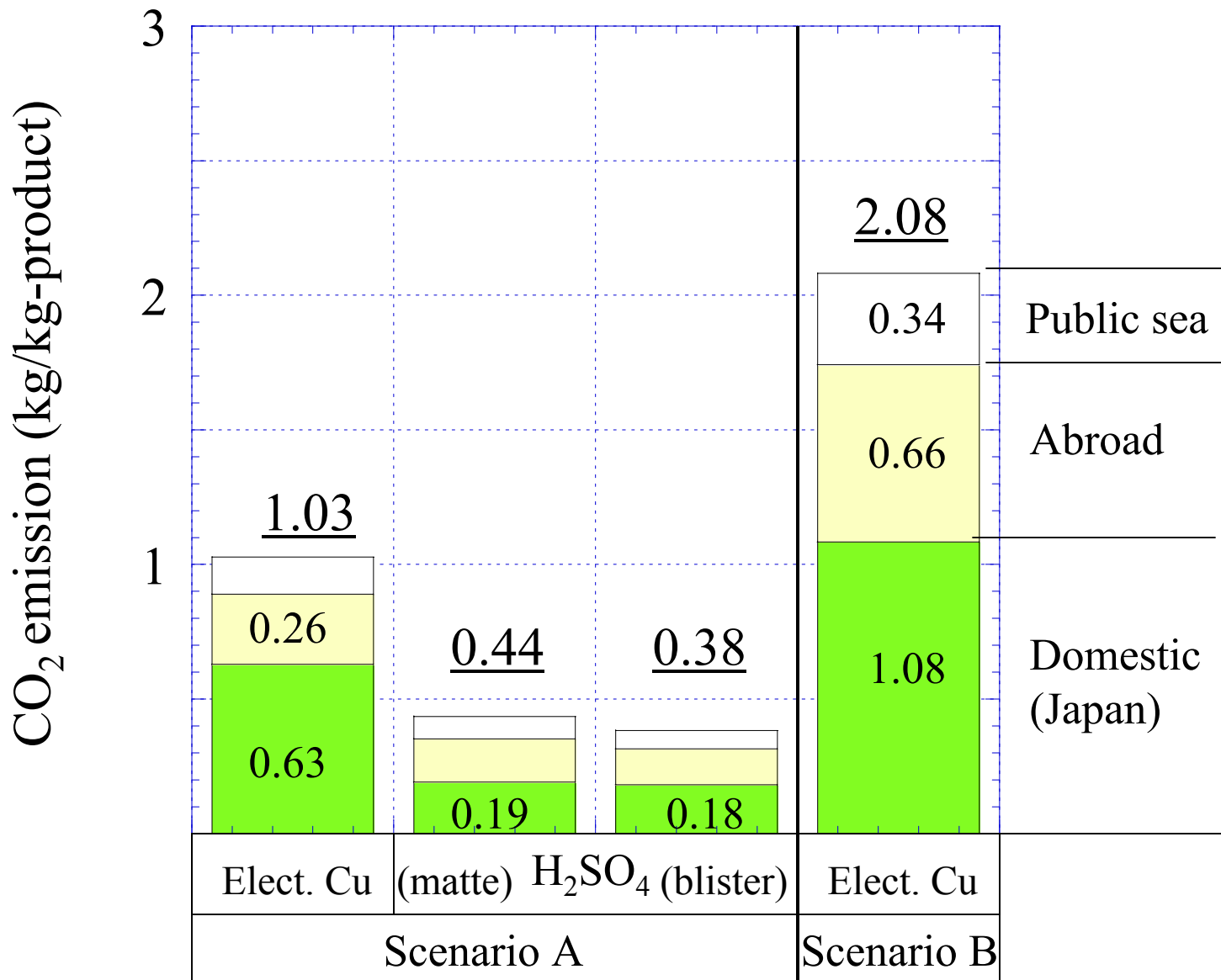


Fig. Comparison of CO₂ emissions of each product in scenarios.

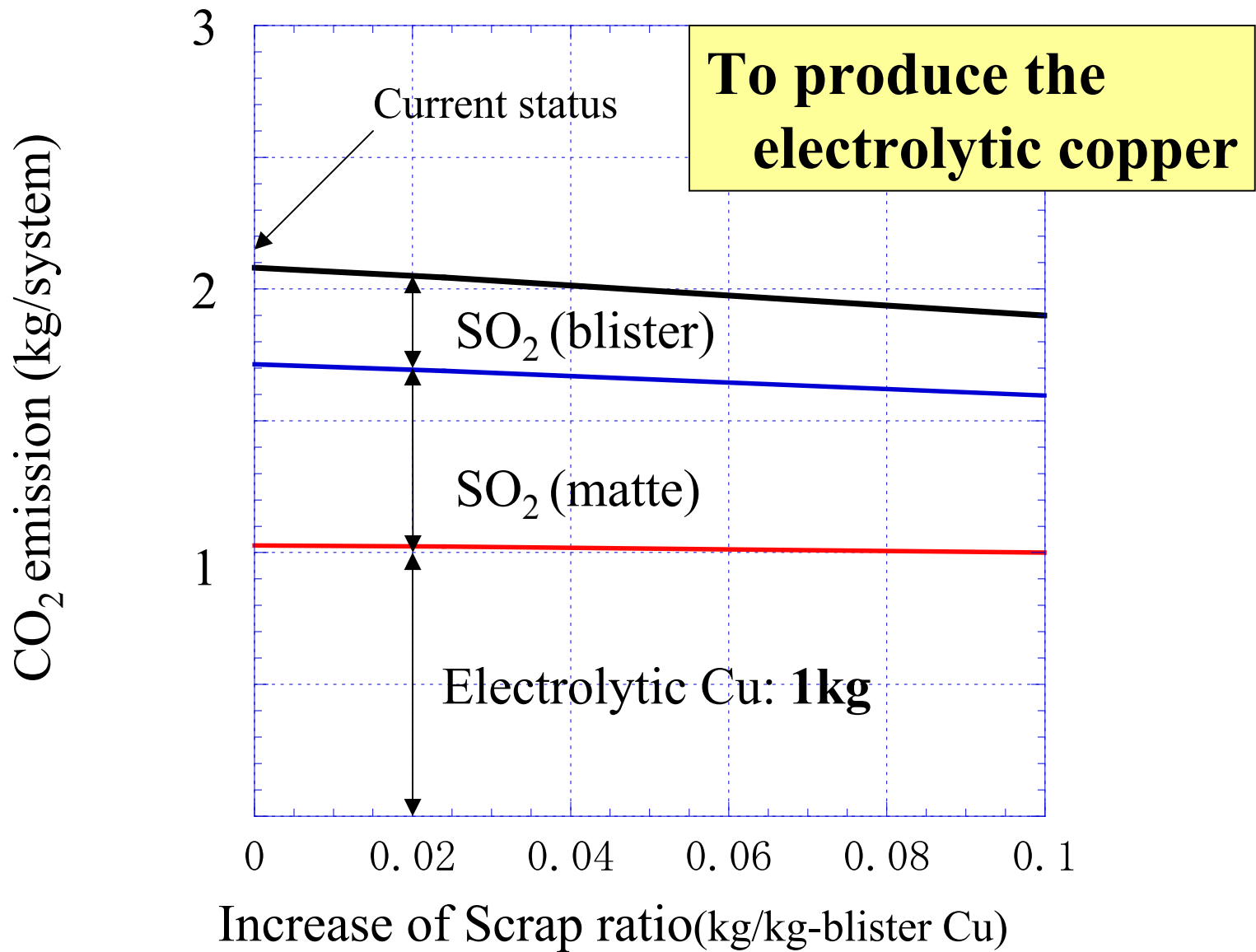


Fig. Relationship between CO₂ emission of the system and the increase of scrap ratio in converter.

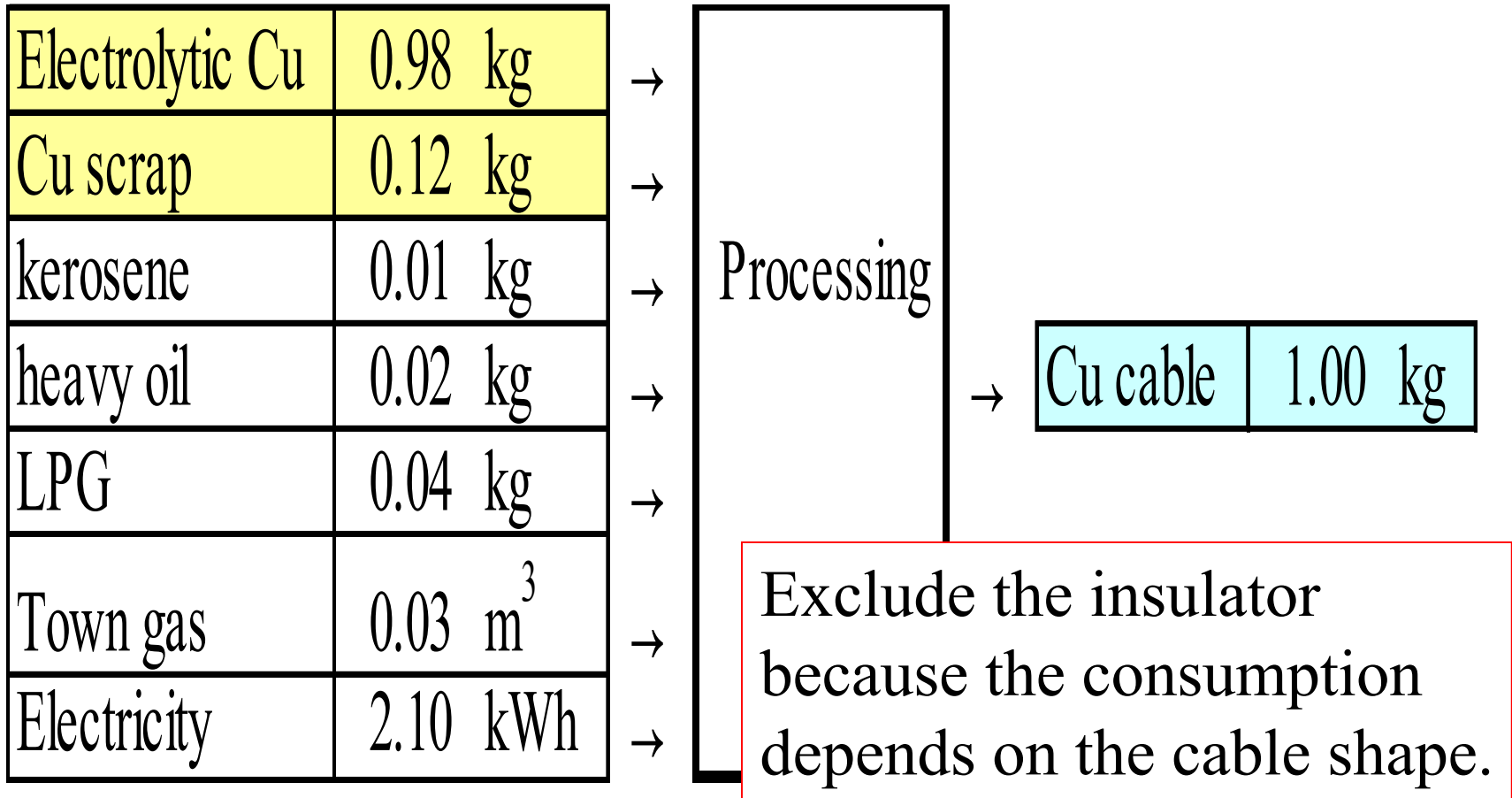


Fig. Inventory for the processing of Cu cable production.

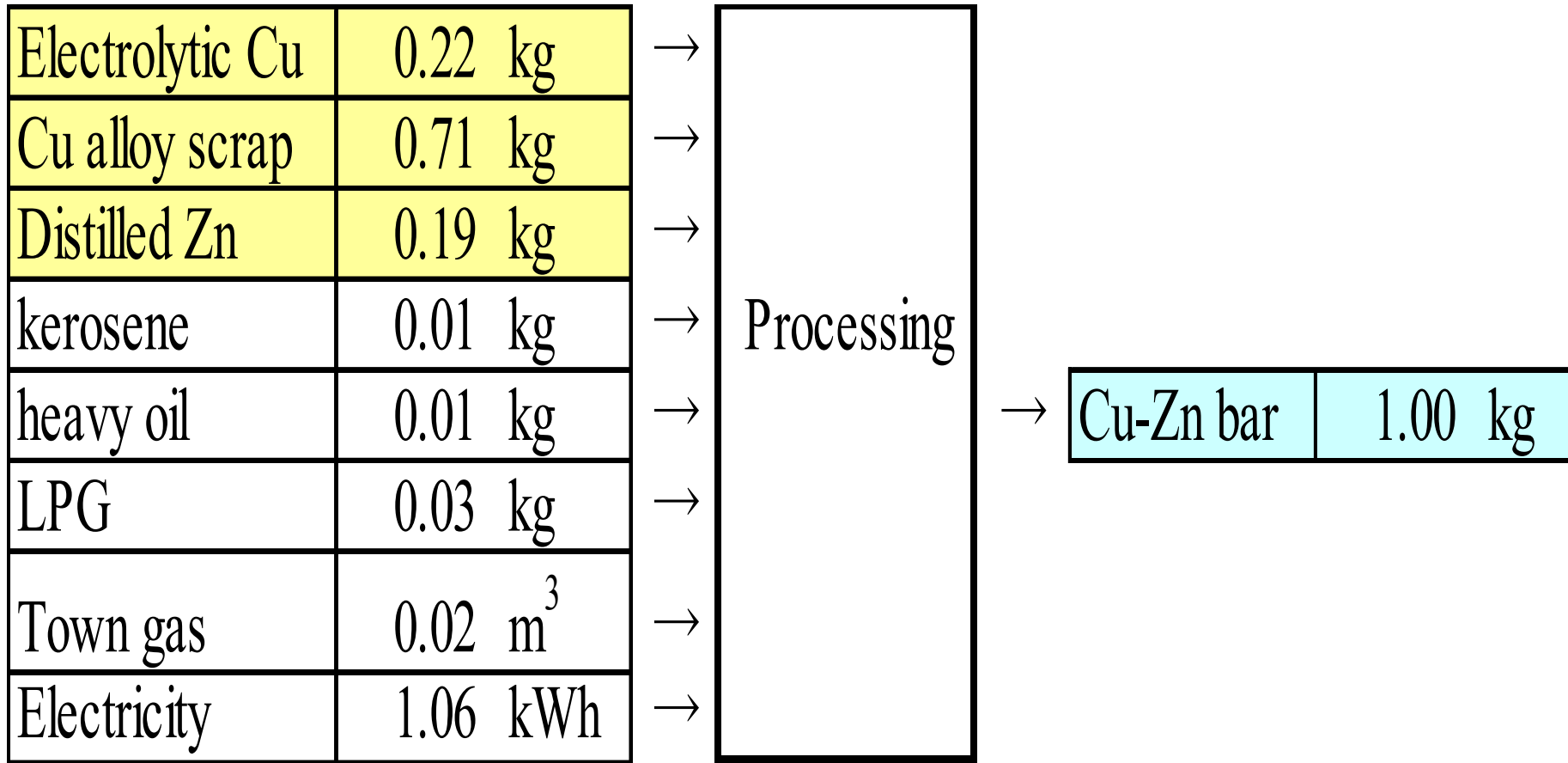


Fig. Inventory for the processing of brass bar production.

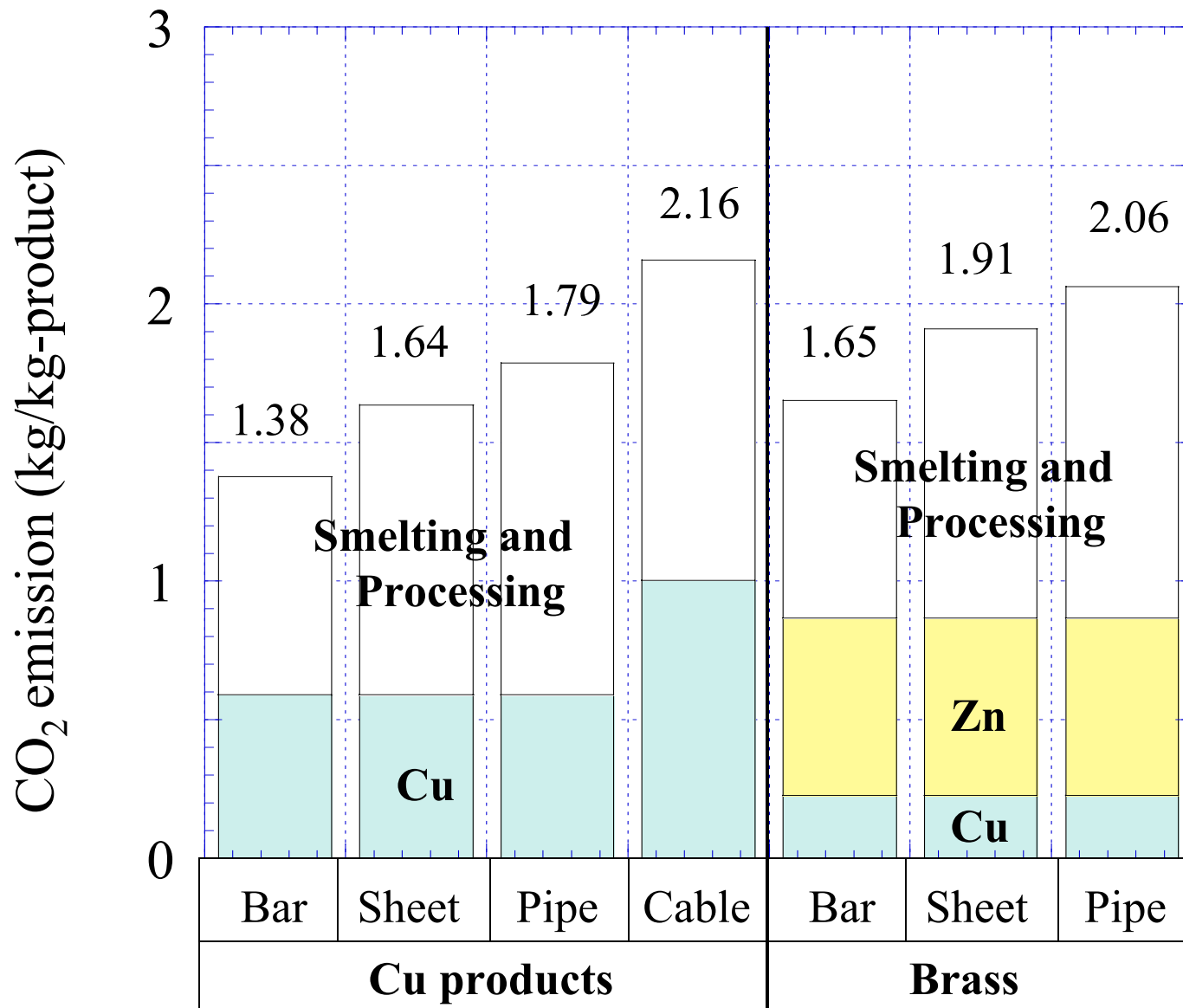
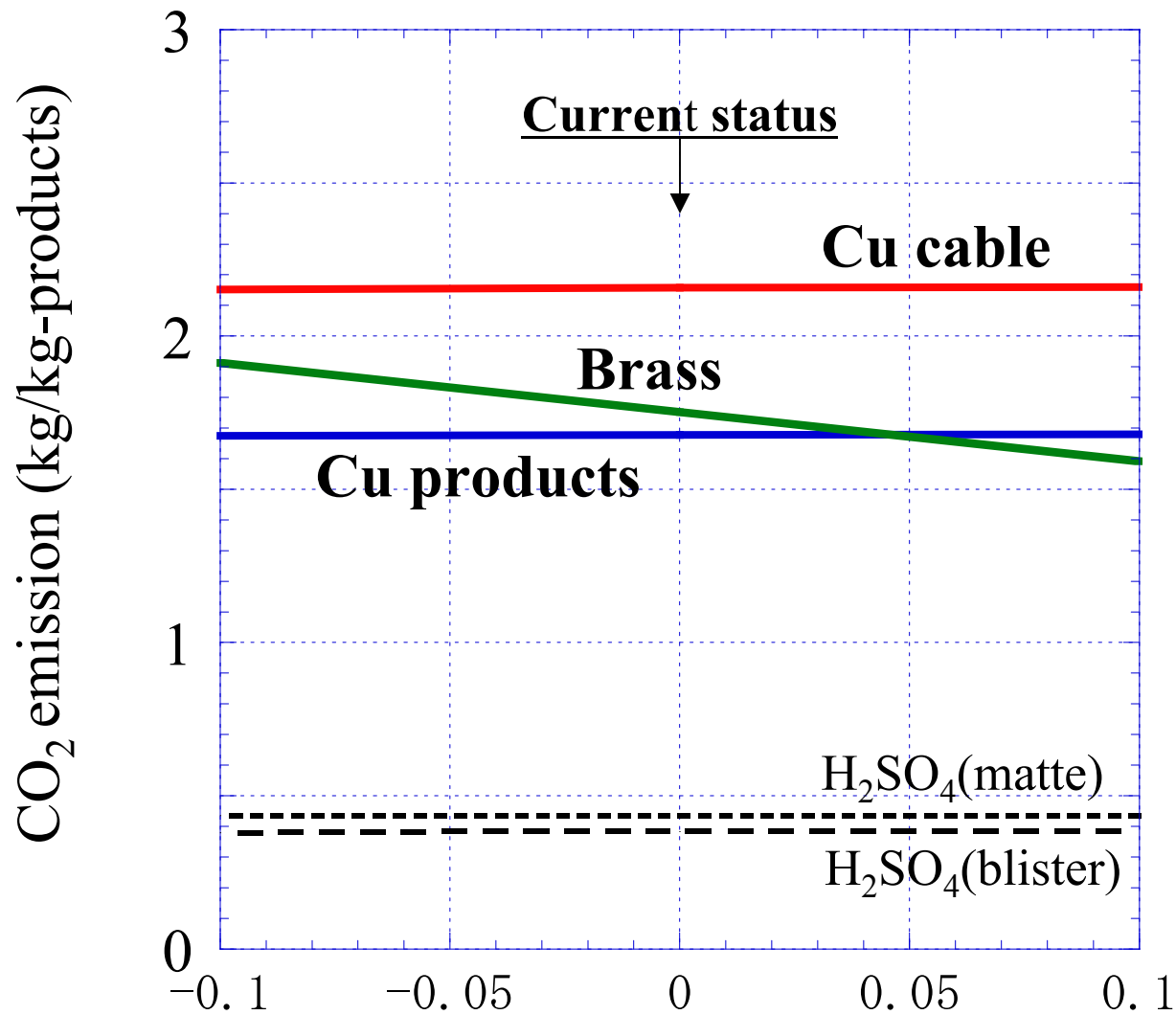
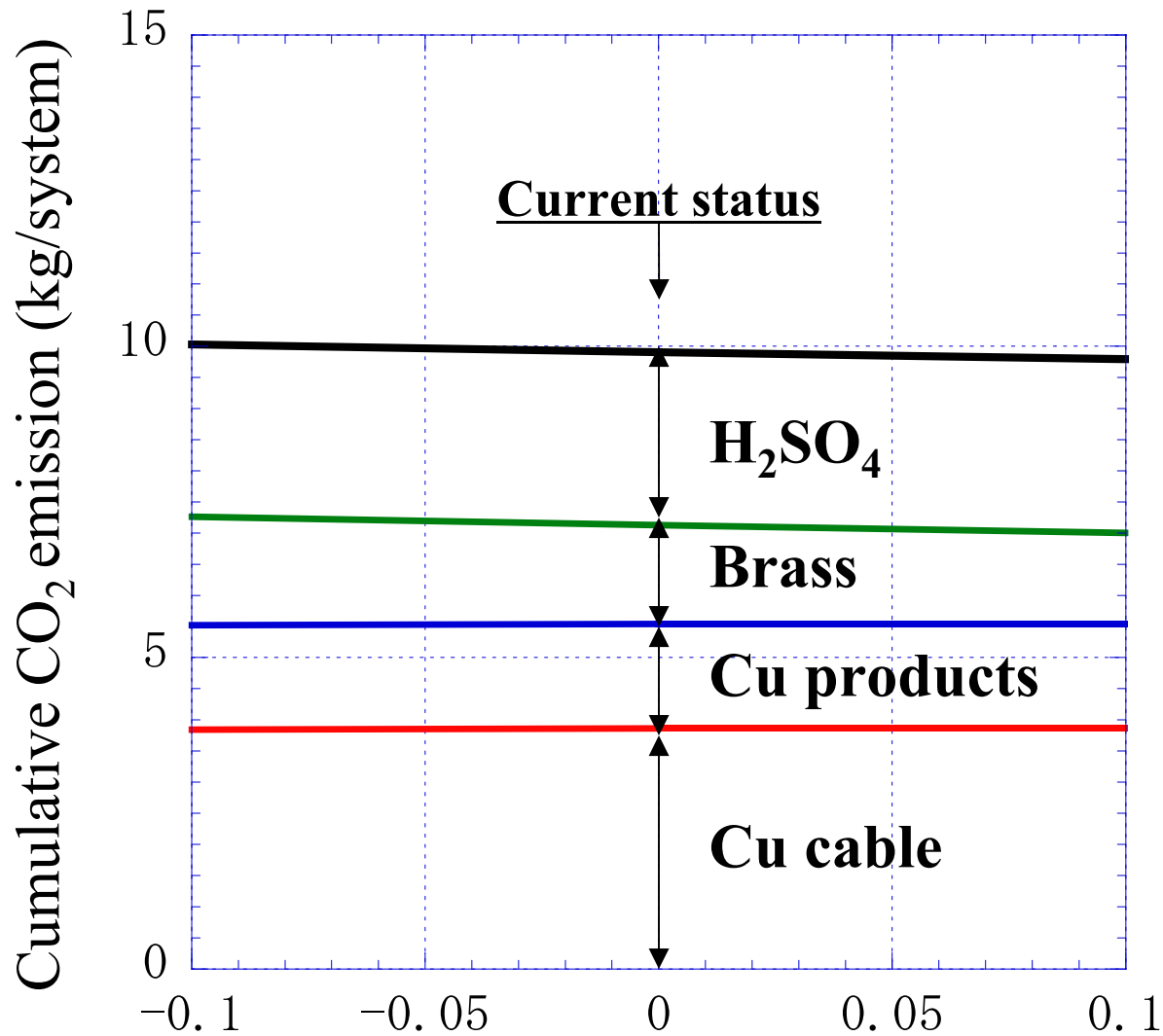


Fig. Comparison of CO₂ emissions between several kinds of Cu, brass products.



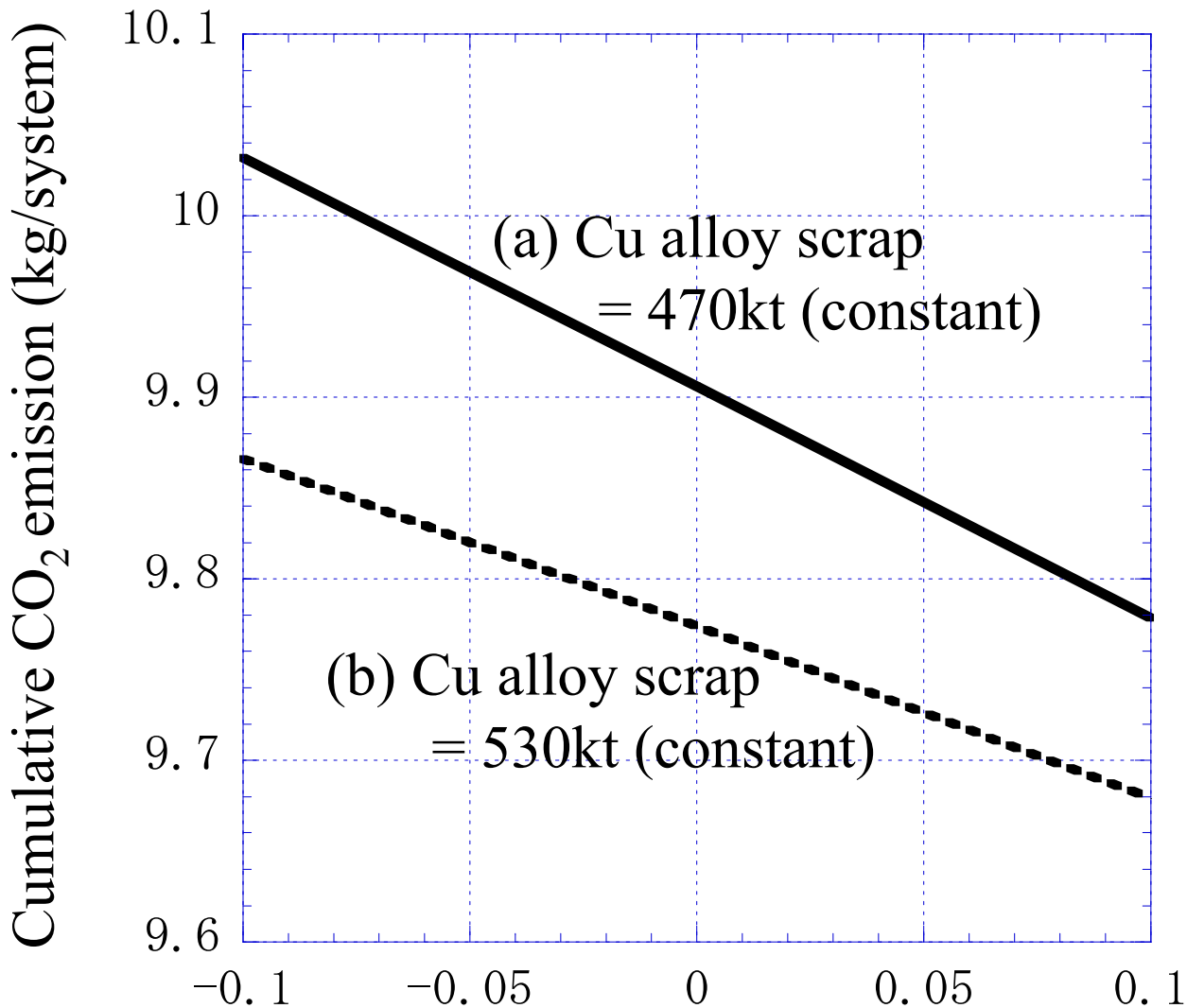
Cu alloy scrap in brass processing (kg/kg-brass products)

Fig. Relationship between CO₂ emissions of the products and Cu alloy scrap ratio in brass processing.



Cu alloy scrap in brass processing (kg/kg-brass products)

Fig. Relationship between CO₂ emissions of the system and Cu alloy scrap ratio in brass processing.

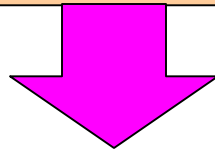


Cu alloy scrap in brass processing (kg/kg-brass products)

Fig. Relationship between CO₂ emissions of the system and Cu alloy scrap ratio in brass processing.

Conclusion

LCI analysis of recycling Cu scrap
to copper products system in Japan
(a) refining (b) processing



Total CO₂ emissions in the system decreases with recycling the scrap to brass processing in the current products structure in Japan.

- (1) The results depends on the products structure.
- (2) The increase to use the scrap in brass leads to the uncertainty of the brass quality.