

## **The Role of Metals in Circular Economies: A Life Cycle Perspective**

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Regulatory and customer-driven initiatives are increasingly focused on characterizing the environmental impacts of material production (e.g., Product Environmental Footprint), as well as their life cycle burdens and benefits (e.g., Circular Economy). To this end, the chemicals industry is being asked to provide ever greater and more sophisticated information to authorities and to customers and downstream users on the environmental footprints of the materials it produces and markets. Metals, indispensable components of modern societies - underpinning economies, cities and transportation, communication, food and power networks - have complex and multiple life cycles that encompass extraction, processing, manufacturing and fabrication, use, waste management, and recycling. Each step along a metal's life cycle has the potential to present environmental challenges that must be quantified and weighed against societal values, but also potential benefits to societies, economies and biomes that require maximising. Sharing a desire to incorporate sustainability into SETAC's mission and guiding principles, we propose a session to present the state of the science related to life cycle methods, theories and practices for metals. The metals and mining industry routinely conducts life cycle assessment studies, using latest industry data, to monitor and document the potential environmental impacts of their products and their processes. In addition, through the emergence of resource efficiency/circular economy as a driver within materials management, the metals and mining industry has generated information to inform users across value chains. As a result, this session will facilitate information exchange on the quality of material cycles, present challenges associated with cultural barriers for data collection, and illustrate the need for a collective response from all stakeholders. The complexity of metal life cycles is an ideal topic within which to examine comprehensive data collection and interpretation, and expand awareness of life concepts in decision making. The session will examine metal life cycles within the following topics: • Harmonized approaches to LCA for metals • LCA case studies • Assessment and interpretation of environmental impacts • Novel approaches to risk in life cycle assessment of chemical fate and toxicity • Approaches to inclusion of resource availability in LCA and LCSA • Water footprinting • Handprinting • Reuse, Recycling, and Remanufacturing