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Identifying patterns of nickel mining and use through multi-level MFA

Barbara Reck

*Center for Industrial Ecology, Yale University
205 Prospect St, New Haven, CT 06511, USA
E-mail: barbara.reck@yale.edu*

Abstract

Material flow studies provide quantitative, spatial, and temporal information at different lifecycle stages. They give insights into the composition of a manufactured product, its share of primary (virgin) versus secondary (recycled) materials, into the end-of-life management of products and materials, and into the quantity and geographic distribution of trade flows. This distinct information can later be used to determine the environmental impacts related to the use of natural resources at different levels. This study addresses these issues through a cross-sectional analysis of nickel for the year 2000. The analysis covers the entire technological nickel cycle and extends to the 60 countries most relevant to nickel worldwide, including both developed and developing countries. Nickel is a widely-utilized industrial metal which is chosen for its corrosion- and heat resistance and its good plating properties. It is commonly used in alloys, with stainless steels covering about 65 percent of the total usage. The characterization of the nickel cycle includes its extraction, fabrication and manufacturing, utilization, end-of-life, and recycling. Detailed data are also available for the related trade flows at all cycle stages, namely for the indirect trade: 30 commodities were identified to characterize the trade of intermediate nickel products, 65 commodities for the trade of manufactured (finished) nickel products. Country-level data are presented in aggregated form and per capita. The analysis examines how countries use nickel along the stages of its cycle. This provides the basis for a better understanding of where resource-intensive processes such as production and fabrication take place, and of where the end use by individuals dominates a country's cycle.