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A environmental impact of refined copper in China based on life cycle assessment

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Copper, as a popular base metal, has many divergent properties such as good ductility, high thermal and electrical conductivity. With the rapid development of the Chinese economy and the continual increase of demand for copper products, China has become the largest producer and consumer of refined copper in the world. The large amount of consumption not only brings resource pressure, but also causes prominent environmental problems. Although copper can be recycled to alleviate resource pressure, there are significant differences between mining primary copper and recycling scrap copper in view of resources, energy consumption and pollution emissions. Life cycle assessment (LCA) is conducted in this study to investigate the total environmental effects of the copper industry. The production of 1t refined copper employing primary ores and secondary resources is analyzed in detail. The results show that the most serious environmental impact of the refined copper was abiotic depletion potential, global warming potential and human toxicity. The environmental impacts are mainly caused by mining and smelting of primary copper by pyrometallurgy. However, for secondary copper, refining and electrolysis are the main factors. According to the normalization result, the total environmental impact of secondary copper is only 1/5 of the primary copper production process, which indicates that the regeneration has better environmental benefits. Thus, it is suggested that the secondary copper should be paid more attention and be developed vigorously. On the other hand, the main processes, which cause environmental impacts, should be promoted technologically.

Biography

WU Yufeng has completed his PhD from Beijing University of Technology. He is a professor and doctoral tutor at Beijing University of Technology. His research activities are focused on policy design and development planning on circular economy, environmental and economic assessment on resources recycling, recycling technology on solid wastes containing strategic resource. He has published more than 50 papers in reputed journals and has been serving as an editorial board member of Resources, Conservation & Recycling journal

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