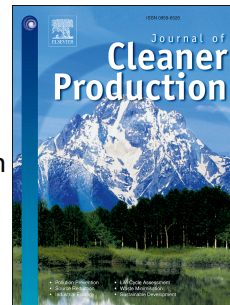


# Accepted Manuscript

Industrial Metabolism of Copper and Sulfur in a Copper-specific Eco-industrial Park in China

Feng Han, Fei Yu, Zhaojie Cui



PII: S0959-6526(16)30667-9

DOI: [10.1016/j.jclepro.2016.05.184](https://doi.org/10.1016/j.jclepro.2016.05.184)

Reference: JCLP 7370

To appear in: *Journal of Cleaner Production*

Received Date: 25 May 2015

Revised Date: 7 May 2016

Accepted Date: 31 May 2016

Please cite this article as: Han F, Yu F, Cui Z, Industrial Metabolism of Copper and Sulfur in a Copper-specific Eco-industrial Park in China, *Journal of Cleaner Production* (2016), doi: 10.1016/j.jclepro.2016.05.184.

This is a PDF file of an unedited manuscript that has been accepted for publication. As a service to our customers we are providing this early version of the manuscript. The manuscript will undergo copyediting, typesetting, and review of the resulting proof before it is published in its final form. Please note that during the production process errors may be discovered which could affect the content, and all legal disclaimers that apply to the journal pertain.

1 **Amount of words: 5253.**

2 **Industrial Metabolism of Copper and Sulfur in a Copper-specific Eco-industrial**  
3 **Park in China**

4 **Feng Han, Fei Yu, Zhaojie Cui\***

5 School of Environmental Science and Engineering, Shandong University, No.27 South Shanda

6 Road, Jinan 250199, PR China

7 \*Corresponding author. Tel.: +86 531 88361176

8 E-mail address: [cuizj@sdu.edu.cn](mailto:cuizj@sdu.edu.cn)

9 **Abstract:** Copper concentrate with high copper and sulfur content is the most important raw  
10 material in the copper industry. With the scarcity of copper ore resources, resource efficiency must  
11 be improved urgently to minimize further losses. This research seeks to elucidate the industrial  
12 metabolism of copper and sulfur in the copper smelting process using substance flow analysis and  
13 in turn aid in the optimization of production processes. A general model is constructed, and six  
14 indices are proposed to quantify and evaluate copper and sulfur metabolisms as well as the  
15 economic performance of the system. The Xiangguang Eco-industrial Park (XGEIP), which is a  
16 typical sector-specific industrial park in China that mainly caters to enterprises dealing with  
17 copper smelting and cathode copper deep processing, is chosen for the case study. On the basis of  
18 a five-year in-depth data collection and verification, this research presents the dynamic changes of  
19 copper and sulfur metabolism in the XGEIP. The results show that the resource utilization  
20 efficiencies of copper and sulfur increased year by year while the environmental impact decreased  
21 from 2008 to 2012. In 2012, resource utilization efficiencies of copper and sulfur reached 99.11%  
22 and 98.84%, respectively. Copper loss occurred mostly in the disposal of slag tailings (0.65%)  
23 while sulfur loss was observed mostly in the waste gas (0.66%). The environmental factors of  
24 copper and sulfur both decreased to 0.014 ton/ton in the system, falling well within the value  
25 range of bulk chemicals (i.e., <1 to 5). Meanwhile, the resource productivity of the copper  
26 concentrate underwent rapid growth with the extension of industrial chains during this period. In  
27 2012, the resource productivity reached 6.20 thousand Yuan/ton, which showed an increase of  
28 786% from that in 2008. These indices indicated that the XGEIP exhibited high productivity and

Download English Version:

<https://daneshyari.com/en/article/8101591>

Download Persian Version:

<https://daneshyari.com/article/8101591>

[Daneshyari.com](https://daneshyari.com)