

Accepted Manuscript

Title: Pilot trial of detoxification of chromium slag in cyclone furnace and production of slag wool fibres

Authors: Guizhou Zhao, Lingling Zhang, Daqiang Cang

PII: S0304-3894(18)30501-6
DOI: <https://doi.org/10.1016/j.jhazmat.2018.06.061>
Reference: HAZMAT 19498



To appear in: *Journal of Hazardous Materials*

Received date: 17-10-2017
Revised date: 26-6-2018
Accepted date: 27-6-2018

Please cite this article as: Zhao G, Zhang L, Cang D, Pilot trial of detoxification of chromium slag in cyclone furnace and production of slag wool fibres, *Journal of Hazardous Materials* (2018), <https://doi.org/10.1016/j.jhazmat.2018.06.061>

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.

Pilot trial of detoxification of chromium slag in cyclone furnace and production of slag wool fibres

Guizhou Zhao^{1,2}, Lingling Zhang^{3,*}, Daqiang Cang^{1,2}

1. School of Metallurgy and Ecological Engineering, University of Science and Technology Beijing, Beijing, 100083, China

2. State Key Laboratory of Advanced Metallurgy, University of Science and Technology Beijing, Beijing, 100083, China

3. School of Energy and Environmental Engineering, University of Science and Technology Beijing, Beijing, 100083, China

* Corresponding author. Tel.: +86 134-0112-0996; E-mail address: linglingzhangll@hotmail.com

Highlights

- Chromium slag was detoxified by a coal-burning cyclone furnace.
- Slag wool fibres were produced by an integrated method.
- Chromium was stabilized and solidified in glass phase of fibres.
- Leaching toxicity tests show the slag wool fibres are environmentally acceptable.

Abstract:

The pilot trial of detoxification of chromium slag in cyclone furnace and production of slag wool fibres were investigated in a power plant in China. 10~30 wt.% chromium slag was mixed with pulverized coal and 0~10 wt.% limestone as the raw materials of the cyclone furnace. Cr(VI) in chromium slag was reduced to Cr₂O₃ inside the cyclone furnace at high temperature. The melt was then produced into slag wool fibres through high-speed centrifugation. Optimal fibres with shot content of 4.5 %, average diameter of 4.8 μm and acidity coefficient of 1.6 were produced with 15 wt.% chromium slag and 5 wt.% limestone in the mixture. Leaching toxicity test showed Cr(VI) of 0.016 mg/L of the produced fibres, which is far below the national standard of China. The total energy consumption could be significantly decreased compared to traditional cupola furnace method. This technique provides an effective and comprehensive technique for the detoxification and utilization of chromium slag at low cost and large-scale.

Key words:

Chromium slag, Cyclone furnace, Detoxification, Slag wool fibres

Download English Version:

<https://daneshyari.com/en/article/6967953>

Download Persian Version:

<https://daneshyari.com/article/6967953>

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