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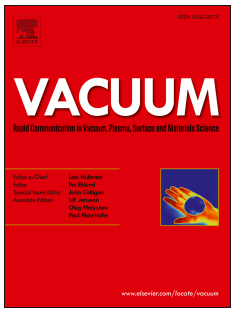

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Zhengen Zhou, Dachun Liu, Heng Xiong, Bo Zhang, Bin Yang, Yong Deng, Jingyang Zhao

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Separation and purification Sb_2S_3 from stibnite by vacuum distillation

Zhengen Zhou, Dachun Liu, Heng Xiong*, Bo Zhang, Bin Yang, Yong Deng, Jingyang Zhao

1.National Key Laboratory for Clean Utilization of Complex Nonferrous Metal Resources, Kunming 650093, China
2.National Engineering Laboratory for Vacuum Metallurgy, Kunming University of Science and Technology, Kunming 650093, China
3.Yunnan Provincial Key Laboratory of Nonferrous Vacuum Metallurgy, Kunming 650093, China

Abstract

Stibnite is the main raw material employed to produce antimony. With the excessive exploitation of high-grade stibnite, low-grade stibnite become more and more important. This study aimed to introduce a vacuum process for recovering and enriching antimony from low-grade stibnite. At the pressure of 10 Pa, by controlling heating temperature, Sb_2S_3 and Sb_2O_3 from stibnite (12.8wt% Sb) was evaporated and enriched. We investigated the influence of vacuum distillation temperature and time on the recovery of low-grade Sb_2S_3. The result indicated antimony recovery could reach about 97% for suitable vacuum distillation conditions, and the purity of Sb_2S_3 was about 95wt%. As for high-grade stibnite, through two-step vacuum distillation, Sb could not only be recovered in the form of Sb_2S_3, but also purified to commercial Sb_2S_3 with a purity about 99.5wt%. The results demonstrated that vacuum distillation is a possible way to recover antimony from low-grade stibnite and purify Sb_2S_3 from high grade stibnite.

Keywords: Vacuum, stibnite, enrichment, purification

1. Introduction

Antimony is found in nature mainly in the form of sulfide mineral stibnite (Sb_2S_3), and stibnite usually exist with Cu, Pb, Zn, Sn sulfide ores and contain minor amounts of gold, silver and mercury sulfides [1,2]. Industrially, stibnite (Sb_2S_3) is the predominant ore of interest and importance [3].