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شماره پروژه ترجمه

نمونه ترجمه

ترجمه مقاله ☒

ترجمه کتاب ☐

مطالعه روند بازیابی فلزات از سرباره‌های فولادی

چکیده

روش‌های پردازش دور ریزهای سرباره‌های فولادسازی از اهمیت قابل توجهی برخوردار هستند. سرباره‌های دور ریز مرکز متالورژی زلاتوست مورد تجزیه و تحلیل قرار می‌گیرد. طرح کاهش دو مرحله‌ای فلز از سرباره های دور ریز با استفاده از طرح احیا در شرایط آزمایشگاهی مورد آزمایش و توسعه قرار می‌گیرد. پارامترهای احیایی که با حداکثر بازیابی اجزای سرباره فلزی در ارتباط باشند، کشف شده. تحقیقات تجربی شامل آزمایشاتی در مورد بازیابی فاز جامد و فاز مایع نمونه‌های سرباره در دمای ۱۰۰۰-۱۵۰۰ درجه سانتی گراد بود. نتایج شبیه سازی ترمودینامیکی و پردازش سرباره در دمای زیاد، نشان داد که می‌توان به بازتولید سرباره های فاز جامد به شرط حضور منواکسید کربن به منظور دسترسی به قطعات فلزی امید داشت.

متن اصلی (انگلیسی) در صفحه بعدی آمده است ...

Study of the Processes of Metal Recovery from Steel Slags

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Abstract

The methods of waste processing and salvaging are considered for steelmaking slags. The dump slags of the Zlatoust metallurgical works are analyzed. A scheme of two-stage metal reduction from the dump slags using the reduction–melting scheme is developed and tested under laboratory conditions. The reduction parameters that correspond to the maximum recovery of a metallic component from the slags are found. Experimental researches included experiments on solid-phase and liquid-phase recovery of slag samples at temperatures of 1000-1500°C. The results of thermodynamic modeling and experimental high-temperature slag processing allow speaking about the advisability of preliminary solid-phase recovery slag in the atmosphere of carbon monoxide with subsequent high-temperature (liquid phase) recovery to obtain the separate metal fractions.

Keywords: Experimental Research, High-Temperature Processes, Steel Smelting Slag, Thermodynamic Modeling

1. Introduction

The issues of processing and salvaging of steel-making slags, mainly dump slags, are challenging. The significance of these issues was highlighted in many works in this field and is determined by technological and ecological aspects. V. N. Kovalev showed the necessity of deep recycling of steelmaking solid waste and identified the main problems of such recycling in his work[1]. There is experience in salvaging steel and blast furnace slag exemplified by the Magnitogorsk Metallurgical Combine[2]. A technological complex for separation of the metal component from slags is rather interesting, however, the proposed technology does not allow fully extracting the valuable metals[3]. The liquid-phase reduction of iron, including from man-made waste, was considered by[4], who highlighted the need for further research in this area, because existing technologies are not high performance ones.

These issues are also 0 important for semi-integrated steel works, such as the Zlatoust Metallurgical Works (ZMW), because of the complex compositions of forming compounds and the absence of sufficiently simple and effective technologies for their processing. According to estimation, slag dumps in ZMW amount to more than 5 mln t, including 61% of steelmaking slags, 19% of a metallic material, 12% of refractory scrap, and 8% of refuse of various origins.[5]

All this necessitates the development of efficient technologies to recover the metallic part of the slags and to use it again in metallurgy as metal-containing raw materials for making low-alloy steel.

The selection of the optimum scheme of slag processing is determined by the following two types of flow charts: Solid-phase reduction – melting (liquid-phase reduction) – two-stage process and melting – liquid-phase reduction – one-stage process[6]. Based on the raw materials (slags) composition and experimental results, it was determined that the two - stage process is the most rational option for the dump slags of ZMW.

This work is aimed at developing the stages of two-stage reduction and the recovery of the metallic component from the dump slags of ZMW under laboratory conditions.

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