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JEDANAESTI SIMPOZIJUM O TERMODINAMICI I FAZNIM DIJAGRAMIMA

sa međunarodnim učešćem

ZBORNIK IZVODA RADOVA

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Izdavač:
Fakultet Tehničkih nauka
Kneza Miloša br.7, 38220 Kosovska Mitrovica
Tel/Fax: (+381 28) 425-320 / 425-322
office@ftn.pr.ac.rs

Za izdavača:
Dekan,
Prof. dr Srđan Jović

Urednik:
Prof. dr Duško Minić

Kompjuterska obrada:
Doc. dr Aleksandar Đorđević

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Exergy analysis of steel manufacturing in the oxygen converter

Vaso Manojlović[1], Aleksandar A. Jovanović[2], Mladen Bugarčić[2], Gvozden Jovanović[2], Branislav Marković[2], Miroslav Sokić[2]

[1]University of Belgrade, Facultz of Technology and Metallurgy,Belgrade, Serbia
[2]Institute for Technology of Nuclear and Other Mineral Raw Material, Belgrade, Serbia

Abstract

In oxygen converters, molten iron from the blast furnace is refined with steel waste under oxidizing conditions [1]. The injected oxygen passes into the iron melt, after which it reacts with the impurities. Analysis of exergy losses clearly indicates the place of energy losses in the observed process, so a detailed analysis can influence the improvement of a complex process [2]. Exergy losses occur due to technological imperfections such as heat dissipation or friction and system irreversibility according to the second law of thermodynamics [3]. The concept of exergy can be used for a better understanding of the feasibility of a process, as well as for the techno-economic analysis of the process at different variations of input/operating parameters. In this work througtful calculation of exergy oxygen convertor was done. According to the obtained data, out of a total of 972.2 MJ of thermal energy, which is released by exothermic reactions in the refining process, 817.5 MJ is pure exergy and can be used, the rest is anergy that arises due to irreversibility.

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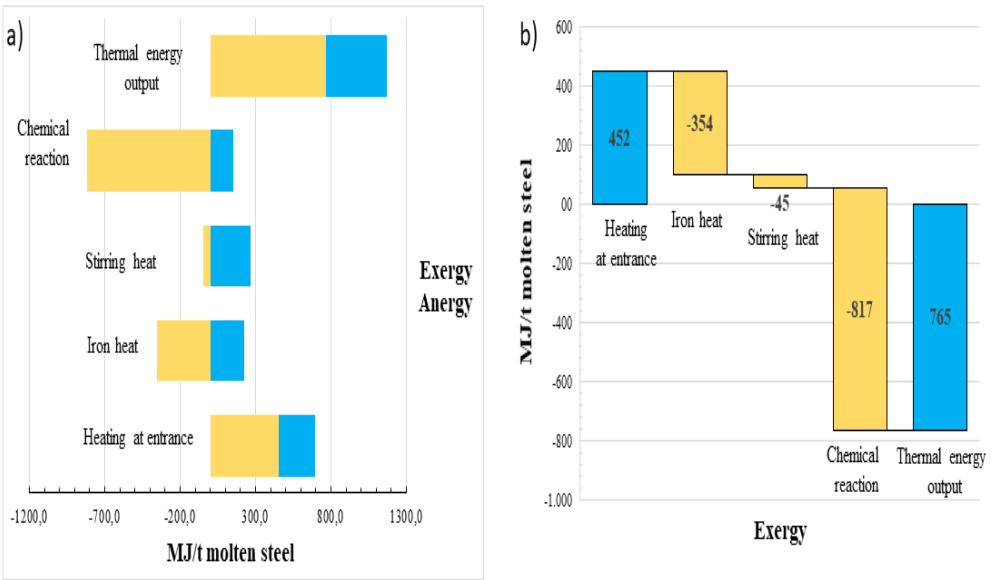

a) Irreversible losses in the process and
b) Exergy balance of the oxygen converter.

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