

Accepted Manuscript

Corrosion testing of diffusion-coated steel in molten salt for concentrated solar power tower systems

D. Fähsing, C. Oskay, T.M. Meißner, M.C. Galetz



PII: S0257-8972(18)30975-7
DOI: doi:[10.1016/j.surfcoat.2018.08.097](https://doi.org/10.1016/j.surfcoat.2018.08.097)
Reference: SCT 23776
To appear in: *Surface & Coatings Technology*
Received date: 24 May 2018
Revised date: 30 July 2018
Accepted date: 2 August 2018

Please cite this article as: D. Fähsing, C. Oskay, T.M. Meißner, M.C. Galetz , Corrosion testing of diffusion-coated steel in molten salt for concentrated solar power tower systems. Sct (2018), doi:[10.1016/j.surfcoat.2018.08.097](https://doi.org/10.1016/j.surfcoat.2018.08.097)

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.

Corrosion Testing of Diffusion-Coated Steel in Molten Salt for Concentrated Solar Power Tower Systems

D. Fähsing, C. Oskay, T.M. Meißner, M.C. Galetz

DECHEMA-Forschungsinstitut, Theodor-Heuss-Allee 25, 60486 Frankfurt am Main, Germany

Tel. +49-69-7564-479; Fax +49-69-7564-388; faehsing@dechema.de

Keywords: ferritic-martensitic steel, diffusion coating, molten salt, concentrated solar power tower plant

Abstract

In the course of energy transition the development of sustainable technologies for power generation providing base load supply is of particular importance. In comparison to photovoltaics Concentrated Solar Power (CSP) Systems have great potential to fulfil this requirement by the use of thermal storage systems utilizing molten salt mixtures as heat transfer fluids. For this purpose, molten nitrates are frequently discussed due to their beneficial thermal and physical properties as well as high operation temperatures.

In order to protect the piping system from degradation, coatings can be applied on the surface of the employed materials, which are commonly steels or Ni-based alloys. The goal is to achieve cost reduction to ensure an even more competitive position of the CSP technology with respect to other renewable sources on the market.

In this study, the corrosion behavior of coated and uncoated ferritic-martensitic steels of type T91 and VM12 in molten salt (mixture of NaNO_3 and KNO_3) has been investigated under isothermal conditions. The diffusion coatings are based on potentially protective elements such as Al, Si or Cr and were applied on the steels either by pack cementation or slurry deposition. Characterization of the samples was conducted by means of optical microscope and EPMA in order to gain a deeper understanding of the occurring corrosion mechanisms and for the purpose of lifetime analysis.

Download English Version:

<https://daneshyari.com/en/article/10156065>

Download Persian Version:

<https://daneshyari.com/article/10156065>

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