

Accepted Manuscript

Understanding microstructure-properties relationship of low-temperature carburized austenitic stainless steels through EBSD analysis

G. Maistro, C. Oikonomou, L. Rogström, L. Nyborg, Y. Cao



PII: S0257-8972(17)30504-2
DOI: doi: [10.1016/j.surfcoat.2017.05.036](https://doi.org/10.1016/j.surfcoat.2017.05.036)
Reference: SCT 22355
To appear in: *Surface & Coatings Technology*
Received date: 20 January 2017
Revised date: 7 April 2017
Accepted date: 12 May 2017

Please cite this article as: G. Maistro, C. Oikonomou, L. Rogström, L. Nyborg, Y. Cao , Understanding microstructure-properties relationship of low-temperature carburized austenitic stainless steels through EBSD analysis, *Surface & Coatings Technology* (2017), doi: [10.1016/j.surfcoat.2017.05.036](https://doi.org/10.1016/j.surfcoat.2017.05.036)

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.

Understanding microstructure-properties relationship of low-temperature carburized austenitic stainless steels through EBSD analysis

G. Maistro^{a,*}, C. Oikonomou^{a,1}, L. Rogström^b, L. Nyborg^a, Y. Cao^a

^aDepartment of Materials and Manufacturing Technology, Chalmers University of Technology, 41296, Gothenburg, Sweden

¹Uddeholms AB, 683 85 Hagfors Sweden

^bDepartment of Physics, Chemistry and Biology, Linköping University, 58183, Linköping, Sweden

*Corresponding author. Email: maistro@chalmers.se. Telephone: +46 (0) 31-772 1531. Fax: +46 (0) 31-772 5944

Abstract

The present article is dedicated to the microstructural characterization of the surface layer of two different austenitic stainless steels, 304L and 904L, subjected to a low-temperature carburizing process (Kolsterising[®], Bodycote) and a subsequent annealing at high-temperature. The carburizing treatment forms a hard expanded austenite in both materials. However, thermal decomposition occurs at high temperatures through precipitation of chromium-carbides, hence compromising the surface hardness of the treated materials. The purpose of this paper is to explore the potential applicability of electron backscatter diffraction (EBSD) technique to reveal the correlation between phase transformation and hardness. First of all, EBSD was used to create Kernel average misorientation (KAM) maps of the modified surface layers to identify the internal strains. Moreover, the preferential sites for precipitation of chromium-compound during annealing were identified. We prove here that EBSD can provide useful information to distinguish the main hardening mechanisms within modified surface layers at different annealing conditions. When combined with nano-indentation, X-ray diffraction (XRD) and glow discharge optical emission spectrometry

Download English Version:

<https://daneshyari.com/en/article/5465143>

Download Persian Version:

<https://daneshyari.com/article/5465143>

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