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Cover Photo:

The cover photograph shows that ESR process of TWIP steel production in special steel plant. A 14 ton TWIP steel ingot has been produced by AOD-ESR process, it is a practical way to obtain high quality TWIP steel ingot, some study on the evolution of non-metallic inclusion has been described by Changling Zhuang and co-workers.

Publishing company:

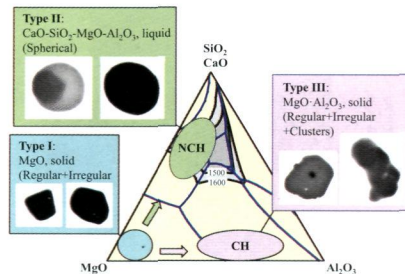
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Contents

Full Paper

E. Roos, A. Karasev,* and P. G. Jönsson
An Experimental and Thermodynamic
Study of Non-Metallic Inclusions in
High Si Stainless Steels Regarding
Clogging During Casting

1410



Characteristics of non-metallic inclusions are investigated in high Si-containing (1.9 and 2.7% Si) stainless steel grades with respect to clogging problems during casting. The obtained results and thermodynamic calculations using Thermo-Calc and FactSage show that the main reason of clogging during casting of these steels having larger than 0.003% of Al is relatively high contents of spinel $MgO-Al_2O_3$ inclusions and clusters in liquid steel.

G. J. Albertsson,* F. Engström, and
L. Teng

Effect of the Heat Treatment on the
Chromium Partition in Cr-Containing
Industrial and Synthetic Slags

1418



Influence of the slag composition and the heat-treatment profile on the chromium immobilization and slag stability in Cr-containing industrial and synthetic slags are studied extensively at the conditions close to industrial. An attempt is made to minimize the environmental and economical impact by cutting down the treatment time and the soaking temperature.

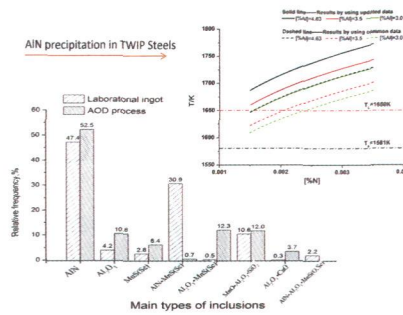
Федеральное государственное
бюджетное учреждение науки
Центральная научная библиотека
Уральского отделения
Российской академии наук (ЦНБ УрО РАН)

Contents

C. Zhuang,* J. Liu,* Z. Mi, H. Jiang, D. Tang, and G. Wang

Non-Metallic Inclusions in TWIP Steel

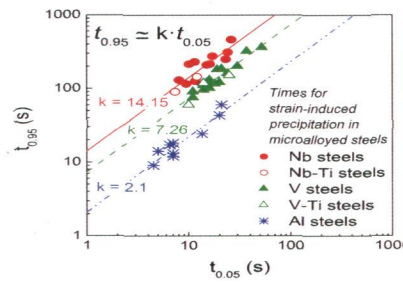
1432



In this study, research work has been carried out to investigate endogenous inclusions formed in Fe–25Mn–3Si–3Al TWIP steels in laboratorial ingot, and mold casting after AOD steelmaking and electroslag remelting (ESR) process at industrial plant, respectively. The research shows that AlN and Al₂O₃ inclusions are found as dominating inclusions. According to thermodynamics, the research finds that AlN inclusions formed in Fe–25Mn–3Si–3Al steels generate in liquid steel, and related experimental results prove this point.

M. Gómez,* A. Quispe and S. F. Medina
Influence of the Microalloying Elements on the Temporary Inhibition of Static Recrystallization by Strain-Induced Precipitates

1440

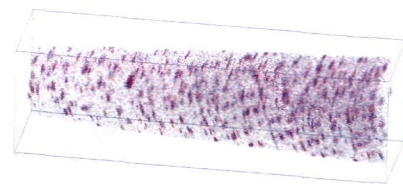


Recrystallization and precipitation kinetics have been characterized in more than twenty microalloyed steels with a broad range of chemical compositions, by means of laboratory hot deformation tests. From this analysis, novel empirical equations are proposed to illustrate the strong variation in the extent of temporary blockage of recrystallization by precipitates in Nb, V, Al, and Ti-microalloyed steels.

H.-L. Yi, L.-Z. Long, Z.-Y. Liu,* and G.-D. Wang

Investigation of Precipitate in Polygonal Ferrite in a Ti-Microalloyed Steel Using TEM and APT

1446

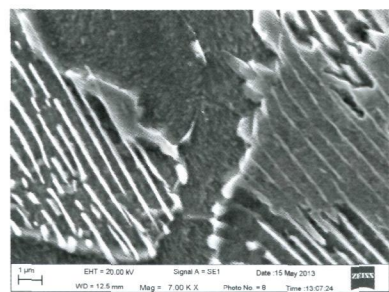


Transmission electron micrograph and atom probe tomography are used to characterize the distribution, sizes and compositions of precipitates in ferrite matrix for a Ti microalloyed steel. The dispersion and interphase nanoprecipitates are observed, and these precipitates are titanium carbide. The atomic ratio of Ti/C is about 0.55, and the average Guinier radius of nanoprecipitate is about 4.3 nm.

C. Zhang,* L. Zhou, X. Liu, X. Wu, and Y. Liu

Reverse Transformation from Ferrite/Pearlite to Austenite and Its Influence on Structure Inheritance in Spring Steel 60Si2MnA

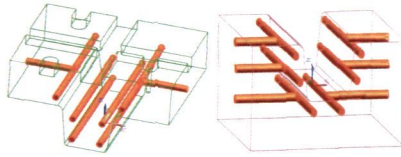
1453



Reverse transformation from a ferrite/pearlite to austenite is investigated in spring steel 60Si2MnA with various pearlite fineness obtained by isothermal transformation. Effects of heating temperature, holding time and interlamellar spacing on the reverse transformation are analyzed and the mechanism of the structure inheritance in the spring steel during heat treatment process is discussed.

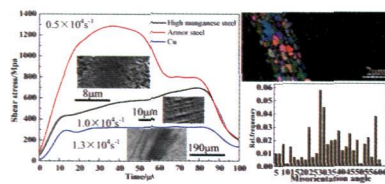
Contents

- L.-Q. Zhang,* W.-F. Tan, and L.-X. Li
Experimental Investigation of Hot Stamping of Ultra High Strength Steel
 _____ 1459



The paper shows that the spring-back angles are greatly reduced after hot stamping. The part strength is obviously improved. The mechanical properties and microstructures in the part show an inhomogeneous phenomenon due to the different cooling condition. The sidewall of the part has a higher tensile strength and a lower elongation compared with the other locations.

- X. Sun, H. Wang, P. Yang,* and W. Mao
Behavior of Transformation-Induced Plasticity during Adiabatic Shear Bands Formation in High Manganese Steels
 _____ 1465



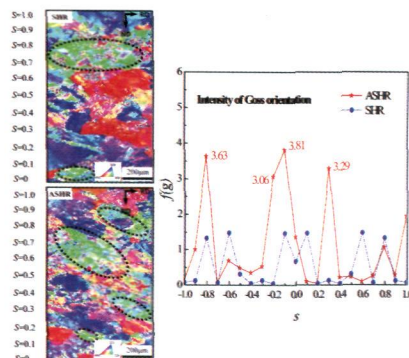
This work demonstrates that at high strain rate of over 10^4 s^{-1} high manganese TRIP steel possesses higher work hardening rate than pure copper and an armor steel containing martensite. TRIP effect occurs smoothly outside shear bands and is suppressed inside them, and it can postpone shear band formation. Dynamic recrystallization proceeds in α' -martensite involved in shear bands.

- J. Mochón, Í Ruiz-Bustanza, A. Vázquez, D. Fernández, J. M. Ayala, M. F. Barbés, and L. F. Verdeja*
Transformations in the Iron–Manganese–Oxygen–Carbon System Resulted from Treatment of Solar Energy with High Concentration
 _____ 1469



Wastes from the iron and steel industry make up a by-product whose exploitation requires high energy consumption. High temperature concentrated thermal solar energy could permit the generation of a high quality product achieving a “zero waste” generation, and a zero energy consumption of traditional fossil fuels.

- H.-Y. Song, H.-H. Lu, H.-T. Liu,* H.-Z. Li, D.-Q. Geng, R. D. K. Misra, Z.-Y. Liu, and G.-D. Wang
Microstructure and Texture of Strip Cast Grain-Oriented Silicon Steel after Symmetrical and Asymmetrical Hot Rolling
 _____ 1477



The effects of hot rolling methods on the microstructure and texture evolution of strip cast grain-oriented silicon steel are investigated. The microstructure of both symmetrically and asymmetrically hot rolled strips consist of ferrite and pearlite. However, compared with the symmetrically hot rolled strip, the asymmetrically hot rolled strip exhibits more dispersive microstructure and much stronger Goss texture.