

Effect of nickel on austenite stabilization during quenching and partitioning process in medium-Mn steels

Ayenampudi, Sudhindra; Celada-Casero, Carola; Sietsma, Jilt; Santofimia, Maria Jesus

Publication date

2019

Document Version

Final published version

Citation (APA)

Ayenampudi, S., Celada-Casero, C., Sietsma, J., & Santofimia, M. J. (2019). *Effect of nickel on austenite stabilization during quenching and partitioning process in medium-Mn steels*. Material Science and Technology 2019, Portland, Oregon, United States.

Important note

To cite this publication, please use the final published version (if applicable).
Please check the document version above.

Copyright

Other than for strictly personal use, it is not permitted to download, forward or distribute the text or part of it, without the consent of the author(s) and/or copyright holder(s), unless the work is under an open content license such as Creative Commons.

Takedown policy

Please contact us and provide details if you believe this document breaches copyrights.
We will remove access to the work immediately and investigate your claim.

Effect of nickel on austenite stabilization during quenching and partitioning process in medium-Mn steels

S. Ayenampudi, C. Celada-Casero, J. Sietsma and M.J. Santofimia

Department of Materials Science and Engineering, Delft University of Technology, Mekelweg 2, 2628 CD Delft, The Netherlands

S.Ayenampudi@tudelft.nl, C.CeladaCasero@tudelft.nl, J.Sietsma@tudelft.nl, M.J.SantofimiaNavarro@tudelft.nl

Austenite stabilization through partitioning of alloying elements from martensite into austenite is a key aspect in the Q&P process. In the current research, two low carbon, medium manganese steels with varying content of nickel, strong austenite stabilizer, are investigated to elucidate the influence of nickel on austenite stability. After partitioning at 400 °C and 600 °C, retained austenite fractions in the final microstructures rise with increasing holding time. In contrast, intermediate partitioning temperature of 500 °C promotes pearlite and carbide formation in austenite, that compete for the carbon available for partitioning, and decrease the retained austenite fractions with time. Results indicate that the addition of nickel slow down the kinetics of competitive reactions during the partitioning stage and significantly increases the fraction of retained austenite. The current in-detail study on the impact of nickel on austenite stability provides new strategies to tailor the Q&P microstructure in this family of alloys.