

33rd ASM Heat Treating Society Conference and Exposition (Heat Treat 2025)

Detroit , Michigan, USA
21-23 October 2025

ISBN: 979-8-3313-2815-3

Printed from e-media with permission by:

Curran Associates, Inc.
57 Morehouse Lane
Red Hook, NY 12571



Some format issues inherent in the e-media version may also appear in this print version.

Copyright© (2025) by ASM International
All rights reserved.

Printed with permission by Curran Associates, Inc. (2026)

For permission requests, please contact ASM International
at the address below.

ASM International
9639 Kinsman Road
Materials Park, Ohio 44073-0002
USA

Phone: +1 440.338.5151

memberservicecenter@asminternational.org

Additional copies of this publication are available from:

Curran Associates, Inc.
57 Morehouse Lane
Red Hook, NY 12571 USA
Phone: 845-758-0400
Fax: 845-758-2633
Email: curran@proceedings.com
Web: www.proceedings.com

TABLE OF CONTENTS

Development of Ethylene Glycol and Clay Based Quench Media for Quench Heat Treatment	1
<i>Neeraj Kumar, Kamala Nathan D, K. Narayan Prabhu</i>	
Effective Strategies for Vacuum Furnace Companies Facing Low-Cost Competition in Global Markets.....	10
<i>Janusz Kowalewski</i>	
Air Quenching Process for Heat-Resistant Steels.....	14
<i>C Paul Qiao, Dan Tanguay, Levi Kempka, Joe Schreiner, Dominic Grillo</i>	
Preventing Discoloration in Vacuum Heat Treatment: Guidelines for Contamination Control.....	21
<i>Janusz Kowalewski</i>	
Effect of Heat Treatment on Hot Hardness of High Temperature Alloys	29
<i>C Paul Qiao, Dan Tanguay, Steve Schmitz, Joe Schreiner, Dominic Grillo</i>	
Bearing the Test of Time: Analyzing the Evolution of a Tapered Roller Bearing from 1952 to 2022.....	35
<i>Christina M. Grassi, Robert S. Crawford, Amanda L. Grow, James R. Gnagy, Lee M. Rothleutner</i>	
Heat Treatment and Nitrogen Alloying of Tool Steel Powders for Additive Manufacturing.....	43
<i>Qianchen Zeng, Thomas L. Christiansen</i>	
Influence of Direct Aging on the Mechanical Behavior of Laser Welded 3D-Printed SAE 630 (17-4PH) Stainless Steel Parts	51
<i>Ata Kamyabi-Gol, Anju Varghese, Alex Neufeld, Mitchell Grams, Gentry Wood, Douglas Hamre, J. Eduardo Alvarez Rocha, Patricio Mendez, Felipe M. Castro Cerda</i>	
Achieving Uniform Tempering Temperature using Simultaneous Induction Heating and Water Spray for Steel Tubes.....	58
<i>Zhichao (Charlie) Li, B. Lynn Ferguson, Stefan Habean, Edward Lee, Jason Meyer</i>	
Effects of Inclusion Properties on Fatigue Behavior of High Strength Bar Steel.....	65
<i>Natalie A. Compton, Kip O. Findley, Peter C. Glaws</i>	
Hybrid Furnace Technology for Intelligent Energy Use.....	74
<i>Bora Özkan, Martin Hellwig</i>	
IIoT-Driven Revolution in Heat Treatment	81
<i>Peter Sherwin</i>	
On the Role of Steel Composition in High Convection Quenching	87
<i>Noah J. Kantor, Marcel A.J. Somers, Thomas L. Christiansen</i>	
Effects of Thermal Processing History on Microstructure and Low Cycle Fatigue Behavior in a Bainitic TRIP Steel	95
<i>Mitchell H. Shields, John G. Speer, Kip O. Findley</i>	
Heat Treatment Process Exploration with HTP Sim.....	103
<i>Jason Meyer, Stefan Habean, Eddy Lee</i>	
In-Situ Determination of Carbide Dissolution in 52100 Bearing Steel	109
<i>Ellen K. Troyanosky, Jianyu Liang, Thomas L. Christiansen</i>	

Effect of Strain Applied During Thermomechanical Processing on Austenite Grain Size After Carburizing in Microalloyed Steels.....	116
<i>L. Carrillo, K.O. Findley, J. Klemm-Toole, D. Wallace</i>	
On the Microstructural Evolution of Metastable Beta Alloys During Gaseous Nitriding	123
<i>Christopher P. Clark, Abhishek Sharma, Thomas L. Christiansen</i>	
Simulation of Quenching and Tempering Process on SAE 1060 Steel Using Aqueous Polyalkylene Glycol (PAG) Polymer	131
<i>Sergio Gallegos-Cantu</i>	
Reducing CO2 Emissions and Carburizing Time by Increasing the Quench Speed of the Quench Oil.....	137
<i>Greg Steiger</i>	
Reduction of CO2 Gas Emissions and Energy Consumption in Heat Treatment Furnaces by Development and Implementation of a Hybrid Furnace Concept	144
<i>Federico Martinez-Guerrero, Carlos Alberto Torres-Narváez, Ma. Guadalupe Ortiz-Lopez</i>	
Transforming Heat Treat Operations: The Power of Digitization and Automation	154
<i>Sefi Grossman</i>	
Utilization of High Frequency Induction Heating for the Reduction of Wrinkle Defects in the Calendaring Process of Lithium-Ion Batteries.....	162
<i>Andreas Seitzer, Andreas Mayr</i>	
The Relevance of the Standard Jominy Test for Rapid/Intensive Quenching.....	166
<i>Gopal Nadkarni, Nafi Bhuiyan, Saikishan Suryanarayanan, Ryan Souders</i>	
Optimization of Pinion Gear Shaft Straightening Process by Incorporating Heat Treatment Information Extracted from Distortion Measurement	174
<i>James Jan, Charlie Li, David Doody, Balaji Arumugam</i>	
Advanced REE Magnets Require New Thermal Process Technologies	189
<i>Thomas Wingens, Michael Glazoff</i>	
Evaluation and Implementation of Low Core Hardness Gears in the SB>1 DEFIANT JMR Technology Demonstrator Aircraft.....	197
<i>Scott Bouwer, Kevin Ignatuk, Timothy DeHennis</i>	
SB>1 DEFIANT JMR Technology Demonstrator Aircraft Main Rotor Gearbox Technology Insertions and Teardown Results	206
<i>Scott Bouwer, Timothy DeHennis</i>	
AI Driven Image Evaluation in Hardness Testing: Integration and Validation of the QAI Module within Qpix2.....	224
<i>Lucas Lurger</i>	

Author Index