

Quick Search Search[View search history](#) | [Back to results](#) | 1 of 0
[Download PDF](#)
[Export](#)
[Print](#)
[E-mail](#)
[Create bibliography](#)
[Add to My List](#)
TMS Annual Meeting

Volume 3, 2011, Pages 915-922

ISBN: 978-111802947-3

CODEN: 85MVA

Document Type: Conference Paper

Source Type: Conference Proceeding

[View references \(33\)](#)
TMS 2011 - 140th Annual Meeting and Exhibition; San Diego, CA; 27 February 2011 through 3 March 2011; Code 85637
[View at publisher](#) |

Microstructural and mechanical properties (hardness) investigations of 0.61%Al-1.11 %Si austempered ductile iron

Kiani-Rashid, A.R. Hashemi, B.

Department of Materials and Metallurgical Engineering, Ferdowsi University of Mashhad, 91775-1111, Mashhad, Iran

Abstract

The effect of aluminium as a strong graphitizing element is known. A lot of investigations have been made by researchers to replace silicon with aluminium in gray and ductile cast irons. The aluminium increases the oxidation resistance at high temperatures and also improves the hardness and strength of the cast irons. Therefore, in this research, by adding a few values of aluminium in presence of silicon, it is tried to determine the microstructure of the experimental samples by using optical and electron microscopes. Thus, the phase transformations are investigated by applying suitable heat treatments by austenitising at 890°C and austempering at 350,400 and 450°C. Furthermore, hardness measurements are used for determining the mechanical properties of the material.

Language of original document

English

Author keywords

Aluminum; Ductile iron; Graphite; Microstructure

Index Keywords

Austempered ductile irons; Austempering; Ductile cast irons; Hardness measurement; High temperature; Micro-structural

Engineering controlled terms: Aluminum; Ductility; Hardness; Investments; Iron; Microstructure

Engineering main heading: Cast iron
References (33) [View in table layout](#)
[Export](#)
[Print](#)
[E-mail](#)
[Create bibliography](#)
Select: Page

- 1 Myszka, D.
Austenite-Martensite transformation in austempered ductile iron
 (2007) *Archives of Metallurgy and Materials*, 52 (3), pp. 475-480. Cited 4 times.
- 2 Dave, J.R.
 (1996) *ASM Specialty Handbook, Cast Iron*. Cited 2 times.
 ASM Press
- 3 Davenport, E.S., Bain, E.C.
Transformation of austenite at constant sub-critical temperatures
 (1930) *Trans. Am Inst. Mining Metallurg. Eng.*, pp. 117-154. Cited 56 times.
 Iron and Steel Division
- 4 Zimba, J., Simbi, D.J., Navara, E.
Austempered ductile iron: An alternative material for earth moving components
 (2003) *Cement and Concrete Composites*, 25 (6), pp. 643-649. Cited 17 times.
 doi: 10.1016/S0958-9465(02)00078-1

[View at publisher](#)**Cited by since 1996**This article has been cited **0** times in Scopus.

Inform me when this document is cited in Scopus:

[Set alert](#) | [Set feed](#)
Related documents

Showing the 2 most relevant related documents by all shared references:

 Kiani-Rashid, A.R. , Edmonds, D.V.
Microstructural characteristics of Al-alloyed austempered ductile irons
 (2009) *Journal of Alloys and Compounds*

 Kiani-Rashid, A.R. , Shayesteh-Zeraati, A. , Naser-Zoshki, H.
As-cast microstructures of aluminium containing ductile cast iron
 (2010) *TMS Annual Meeting*
[View all related documents](#) based on all shared references or [select the shared references](#) to use
Find more related documents in Scopus based on:
[Authors](#) | [Keywords](#)
My Applications[Add](#) **More By These Authors**
 The authors of this article have a total of **20 records** in Scopus:
 (Showing 5 most recent)

Effect of aluminum on stability of retained austenite in bainitic malleable cast iron
 (2011) *Metal Science and Heat Treatment*

 Erfanian-Naziftoosi, H.R., Haghdaei, N., Kiani-Rashid, A.R.
The Effect of Isothermal Heat Treatment Time on the Microstructure and Properties of 2.11% Al Austempered Ductile Iron
 (2011) *Journal of Materials Engineering and Performance*
[Hide Applications](#)

- 5 Roedter, H.
ADI - Austempered Ductile Iron
(2004) *Biuletyn Metals Minerals*, 2.
- 6 Hayrynen, K.L., Keough, J.R.
Austempered Ductile Iron - The State of the Industry in 2003
Keith Millis Symposium on Ductile Cast Iron 2003, Livonia, Michigan, USA
- 7 Guzik, E.
Some selected problems concerning the processes of cast iron improvement
(2001) *Archives of Foundry IM*
- 8 Binczyk, F.
(2003) *Constructional Casting Alloys*. Cited 2 times.
Silesian Technical University, Gliwice
- 9 Mysza, D.
Structural research of direct austempered ductile irons obtained in sand mould
(2001) *Archives of Foundry*, 1 (1), pp. 263-270.
in Polish
- 10 Darwish, N., Elliott, R.
(1993) *Mater. Sci. Tech.*, 9, p. 586. Cited 30 times.
- 11 Voigt, R.C., Loper, C.R.
Proc. 1st Int. Conf. on Austempered Ductile Iron, ASM, Metals Park, OH (1984), p. 83.
- 12 Rao, P.P., Putatunda, S.K.
Comparative study of fracture toughness of austempered ductile irons with upper and lower ausferrite microstructures
(1998) *Materials Science and Technology*, 14 (12), pp. 1257-1265. Cited 21 times.
- 13 Shanmugam, P., Prasad Rao, P., Rajendra Udupa, K., Venkataraman, N.
Effect of microstructure on the fatigue strength of an austempered ductile iron
(1994) *Journal of Materials Science*, 29 (18), pp. 4933-4940. Cited 49 times.
doi: 10.1007/BF00356546

[View at publisher](#)
- 14 Prasad Rao, P., Putatunda, S.K.
Investigations on the fracture toughness of austempered ductile iron alloyed with chromium
(2003) *Materials Science and Engineering A*, 346 (1-2), pp. 254-265. Cited 9 times.
doi: 10.1016/S0921-5093(02)00541-5

[View at publisher](#)
- 15 Yu, S.K., Loper, C.R.
Effect of molybdenum, copper and nickel on the pearlitic and martensitic hardenability of ductile iron
(1988) *AFS Transaction*, 96, pp. 811-821. Cited 12 times.
- 16 Kiani-Rashid, A.R.
(2000) *The Influence of Aluminum and Heat Treatment Conditions on Austempered Ductile Irons*. Cited 5 times.
Ph.D. Thesis, University of Leeds
- 17 Boutorabi, S.M.A.
(1991) *The Austempering Kinetics, Microstructure and Mechanical Properties of Spheroidal Graphite Unalloyed Aluminum Cast Iron*. Cited 6 times.
Ph.D. Thesis, University of Birmingham, May
- 18 Stefanescu, D.M.
Thermodynamic Properties of Iron-Base Alloys
(1992) *ASM Handbook*, 15, pp. 61-70. Cited 4 times.
9th edition, Metals Handbook
- 19 Kiani-Rashid, A.R., Edmonds, D.V.
Microstructural characteristics of Al-alloyed austempered ductile irons
(2009) *Journal of Alloys and Compounds*, 477 (1-2), pp. 391-398.
doi: 10.1016/j.jallcom.2008.10.038

[View at publisher](#)
- 20 Elliott, R.
(1988) *Cast Iron Technology*. Cited 113 times.
Butterworths & Co. (Publishers) Ltd., London
- 21 Defrancq, C., Van Fegham, J., Desy, A.A.
36th Int. Foundry Congress, Belgrad, 1969
- 22 Boutorabi, S.M.A.
(1991)
Ph.D. Thesis, University of Birmingham, May

- 23 Boutorabi, S.M.A., Young, J.M., Kondic, V., Salehi, M.
The tribological behaviour of austempered spheroidal graphite aluminium cast iron
 (1993) *Wear*, 165 (1), pp. 19-24. [Cited 5 times](#).
[View at publisher](#)
- 24 Aranzabal, J., Gutierrez, I., Rodriguez-Ibabe, J.M., Urcola, J.J.
Influence of heat treatments on microstructure and toughness of austempered ductile iron
 (1992) *Materials Science and Technology*, 8 (3), pp. 263-273. [Cited 36 times](#).
- 25 Sidjanin, L., Smallman, R.E., Boutorabi, S.M.
 (1994) *Mater. Sci. Technol.*, 10, pp. 711-720. [Cited 21 times](#).
- 26 Bayati, H., Elliott, R.
 (1995) *Materials Science and Technology*, 11, pp. 118-129. [Cited 37 times](#).
- 27 Prasad Rao, R., Putatunda, S.K.
Investigations on the fracture toughness of austempered ductile irons austenitized at different temperatures
 (2003) *Materials Science and Engineering A*, 349 (1-2), pp. 136-149. [Cited 19 times](#).
 doi: 10.1016/S0921-5093(02)00633-0
[View at publisher](#)
- 28 Bahmani, M., Elliott, R.
 (1994) *Materials Science and Technology*, 10, pp. 1050-1056. [Cited 11 times](#).
- 29 Bayati, H., Elliott, R.
 (1995) *Materials Science and Technology*, 11, pp. 284-293. [Cited 33 times](#).
- 30 Boutorabi, S.M.A., Young, J.M., Kondik, V.
 (1993) *Transactions of Japan Foundrymen's Society*, 12, pp. 14-17. [Cited 4 times](#).
- 31 Brown, J.R.
 (2000) *Foseco Ferrous Foundryman's Handbook*, pp. 70-89. [Cited 32 times](#).
 Butterworth-Heinemann
- [View at publisher](#)
- 32 Stefanescu, D.M.
Thermodynamic Properties of Iron-Base Alloys
 (1992) *ASM Handbook*, 15, pp. 61-70. [Cited 4 times](#).
 9th edition, Metals Handbook
- 33 Golozar, M.A.
 (1990) *Principles and Applications of Heat Treatment of Steels and Irons*, pp. 481-494.
 2th edition

 Kiani-Rashid, A.R.; Department of Materials and Metallurgical Engineering, Ferdowsi University of Mashhad, 91775-1111, Mashhad, Iran; email: kianirashid@gmail.com
 © Copyright 2011 Elsevier B.V., All rights reserved.

TMS Annual Meeting
 Volume 3, 2011, Pages 915-922

[View search history](#) | [Back to results](#) | **1 of 0**

[Top of page](#)

Search Sources Analytics My alerts My list My settings

Help

About Scopus
[What is Scopus](#)
[Content coverage](#)
[What do users think](#)
[Latest](#)
[Tutorials](#)
[Developers](#)

Contact and Support
[Contact and support](#)
[Live Chat](#)

About Elsevier
[About Elsevier](#)
[About SciVerse](#)
[About SciVal](#)
[Terms and Conditions](#)
[Privacy Policy](#)



Copyright © 2011 Elsevier B.V. All rights reserved. SciVerse® is a registered trademark of Elsevier Properties S.A., used under license. Scopus® is a registered trademark of Elsevier B.V.