

Quick Search Search
[View search history](#) | [Back to results](#) | [< Previous](#) **9 of 21** [Next >](#)
[Download PDF](#) [Export](#) [Print](#) [E-mail](#) [Create bibliography](#) [Add to My List](#)
TMS Annual Meeting

2010, Pages 37-47

ISBN: 978-161782293-3

CODEN: 85MVA

Document Type: Conference Paper

Source Type: Conference Proceeding

Sponsors: Extr. Process. Div. (EPD) Miner., Metals, Mater. Soc. (TMS)

[View references \(17\)](#)
EPD Congress 2010 - TMS 2010 Annual Meeting and Exhibition; Seattle, WA; 14 February 2010 through 18 February 2010; Code 84352

As-cast microstructures of aluminium containing ductile cast iron

 Kiani-Rashid, A.R.^a Shayesteh-Zeraati, A.^b, Naser-Zoshki, H.^c, Yousef-Sani, M.R.^a
^a Department of Materials Engineering, Faculty of Engineering, Ferdowsi University of Mashhad, P.O.Box. 91775-1111, Mashhad, Iran

^b Department of Materials Science and Engineering, Sharif University of Technology, Tehran, P.O. Box 11365-9466, Tehran, Iran

^c Department of Materials and Metallurgical Engineering, Iran University of Science and Technology, Tehran, Iran
Abstract

In this paper, the effect of aluminum content on the formation mechanism, volume fraction, morphology and particle size distribution of graphite has been investigated. Addition of aluminum on ductile iron causes some fundamental changes in iron-carbon phase-diagram and as a result, improves the graphite formation during eutectic transformation. The results reveals that aluminum compounds have been formed in the core of graphite nodules, thus aluminum plays an important role in the formation of graphite nodules. Furthermore, it is indicated that an increase in the aluminum content also leads to an increase in the number of graphite nodules and a decrease in the nodules size. By using EPMA, the segregation of aluminum and silicon between graphite nodules has been studied.

Language of original document

English

Author keywords

Casting; Microscopy; Nucleation; Phase transformation; Precipitation

Index Keywords

Aluminum contents; As cast microstructure; Carbon phase; Ductile cast irons; Ductile iron; EPMA; Eutectic transformation; Formation mechanism; Fundamental changes; Graphite formation; Graphite nodules; Microscopy; Phase transformation; Precipitation

Engineering controlled terms: Aluminum; Aluminum compounds; Graphite; Nucleation; Particle size analysis

Engineering main heading: Cast iron
References (17) [View in table layout](#)
[Export](#) [Print](#) [E-mail](#) [Create bibliography](#)
Select: Page

- 1 Dave, J.R. (1996) *ASM Specialty Handbook, Cast Iron*. Cited 2 times. ASM press
- 2 Stefanescu, D.M. **Theory of Solidification and Graphite Growth in Ductile Iron** (1992) *AFS Ductile Iron Hand Book*, pp. 1-17. Cited 2 times. Cast Metals Institute
- 3 Stefanescu, D.M. **Thermodynamic Properties of Iron-Base Alloys** (1992) *ASM Handbook*, 15, pp. 61-70. Cited 4 times. 9th Edition, Metals Handbook

Cited by since 1996This 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:

 Shayesteh-Zeraati, A. , Naser-Zoshki, H. , Kiani-Rashid, A.R. **The effect of aluminium content on morphology, size, volume fraction, and number of graphite nodules in ductile cast iron** (2010) *Proceedings of the Institution of Mechanical Engineers, Part L: Journal of Materials: Design and Applications*

 Shayesteh-Zeraati, A. , Naser-Zoshki, H. , Kiani-Rashid, A.R. **Microstructural and mechanical properties (hardness) investigations of Al-alloyed ductile cast iron** (2010) *Journal of Alloys and Compounds*
[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., Haghdad, 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](#)

- 4 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, UK
- 5 Riposan, I., Chisamera, M., Stan, S., Skaland, T.
Proceedings of the AFS Cast Iron Inoculation Conf., Schaumburg, Illinois 2005, pp. 31-41.
- 6 Sommerfeld, A., Böttger, B., Tonn, B.
Graphite nucleation in cast iron melts based on solidification experiments and microstructure simulation
(2008) *Journal of Materials Science and Technology*, 24 (3), pp. 321-324. Cited 6 times.
- 7 Boutorabi, S.M.A.
(1991) *The Austempering Kinetics, Microstructure and Mechanical Properties of Spherical Graphite Unalloyed Aluminum Cast Iron*. Cited 6 times.
Ph.D. Thesis, University of Birmingham
- 8 Smickley, R.J., Rundman, K.B.
(1981) *AFS Trans.*, 89, pp. 205-214. Cited 3 times.
- 9 Elliott, R.
(1988) *Cast Iron Technology*. Cited 113 times.
Butterworths & Co. (Publishers) Ltd., London
- 10 Angus, H.T.
(1978) *Cast Iron, Physical and Engineering Properties*. Cited 97 times.
Butterworths & Co (Publishers) Ltd., London
- 11 Brown, J.R.
(2000) *Foseco Ferrous Foundry Man's Handbook*, pp. 70-89.
Butterworth-Heinemann
[View at publisher](#)
- 12 Haque, M.M., Young, J.M.
Production of spheroidal graphite aluminium cast iron and the factors affecting it
(1995) *Journal of Materials Processing Tech.*, 55 (3-4), pp. 186-192. Cited 7 times.
[View at publisher](#)
- 13 Kiani-Rashid, A.R., Edmonds, D.V.
(2002) *IJE Transaction B*, 15 (3), pp. 261-272. Cited 13 times.
- 14 Carlberg, T., Fredriksson, H.
(1979) *Solidification of Casting of Metals*, pp. 115-124. Cited 7 times.
The Metals Soc.
- 15 Zhukov, A.A.
THERMODYNAMICS OF STRUCTURE FORMATION IN CAST IRON ALLOYED WITH GRAPHITIZING ELEMENTS.
(1979) *Metals Forum*, 2 (2), pp. 127-136. Cited 9 times.
- 16 Kiani-Rashid, A.R., Golozar, M.A.
(2003) *Esteghlal J.*, 2, pp. 177-188. Cited 3 times.
- 17 Nakae, H., Jung, S., Shin, H.-C.
Formation mechanism of chunky graphite and its preventive measures
(2008) *Journal of Materials Science and Technology*, 24 (3), pp. 289-295. Cited 5 times.

 Kiani-Rashid, A. R.; Department of Materials Engineering, Faculty of Engineering, Ferdowsi University of Mashhad, P.O.Box. 91775-1111, Mashhad, Iran; email: fkiana@yahoo.com
© Copyright 2011 Elsevier B.V., All rights reserved.

TMS Annual Meeting
2010, Pages 37-47

[View search history](#) | [Back to results](#) | [< Previous 9 of 21](#) [Next >](#)

[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.