

## Document details

< Back to results | 1 of 2 Next >

Export Download Print E-mail Save to PDF Add to List More... >

[Full Text](#) View at Publisher

IOP Conference Series: Materials Science and Engineering  
Volume 290, Issue 1, 30 January 2018, Article number 012007  
International Conference on Advances in Manufacturing and Materials Engineering 2017, ICAMME 2017;  
International Islamic University Malaysia (IIUM), Gombak Campus Kuala Lumpur; Malaysia; 8 August 2017 through 9  
August 2017; Code 134404

## Effects of forming temperature and sintering rate to the final properties of FeCuAl powder compacts formed through uniaxial die compaction process (Conference Paper) (Open Access)

Rahman, M.M.<sup>a</sup> ✉, Ismail, M.A.<sup>a</sup>, Sopyan, I.<sup>b</sup>, Rahman, H.Y.<sup>a</sup>

<sup>a</sup>Department of Mechanical Engineering, Universiti Tenaga Nasional, Putrajaya Campus, Jalan IKRAM-UNITEN, Selangor, Kajang, Malaysia

<sup>b</sup>Department of Manufacturing and Materials Engineering, Kulliyah of Engineering, International Islamic University Malaysia, PO Box 10, Kuala Lumpur, Malaysia

### Abstract

View references (9)

This paper presents the outcomes of an experimental investigation on the effects of forming temperature and sintering schedule to the final characteristics of FeCuAl powder mass formed at different temperature and sintered at different schedule. A lab-scale uni-axial die compaction rig was designed and fabricated which enabled the compaction of powder mass at room temperature as well as elevated temperature. Iron (Fe) powder ASC 100.29 was mechanically mixed with other elemental powders, namely copper (Cu), and aluminum (Al) for 60 minutes and compacted at three different temperature, i.e., 30°C, 150°C, and 200°C by applying 425 MPa of simultaneous downward and upward axial loading to generate green compacts. The as-pressed samples were inspected visually and the defect-free green compacts were subsequently sintered in an argon gas fired furnace at 800°C for 60 min at three different heating/cooling rates, i.e., 5, 10, and 15°C/min, respectively. The sintered samples were then characterised for their physical, electrical, and mechanical properties. The microstructures of the sintered samples were also analysed. The results revealed that a forming temperature of 150°C and a sintering rate of 10°C/min could produce a product with better characteristics. © Published under licence by IOP Publishing Ltd.

### Indexed keywords

Engineering controlled terms: Aluminum alloys Argon Compaction Copper alloys Iron alloys Manufacture Powders Ternary alloys

Compendex keywords: Elemental powders Elevated temperature Experimental investigations Forming temperature Heating/cooling rate Powder compacts Sintered samples Uniaxial die compaction

Engineering main heading: Sintering

### Funding details

Funding number	Funding sponsor	Acronym	Funding opportunities
20140117	Ministry of Higher Education, Malaysia	MOHE	See opportunities by MOHE

### Funding text

This research is financially supported by Ministry of Higher Education (MOHE) Malaysia through the research project 20140117 FRGS.

### Metrics

0 Citations in Scopus  
0 Field-Weighted Citation Impact



### PlumX Metrics

Usage, Captures, Mentions, Social Media and Citations beyond Scopus.

### Cited by 0 documents

Inform me when this document is cited in Scopus:

[Set citation alert >](#)

[Set citation feed >](#)

### Related documents

Effects of sintering time and temperature to the characteristics of FeCrAl powder compacts formed at elevated temperature

Rahman, M.M. , Rahman, H.Y. , Awang, M.A.A. (2018) *IOP Conference Series: Materials Science and Engineering*

Sintering of FeCuAl powder compacts formed through die compaction process at elevated temperature

Rahman, M.M. , Ismail, M.A. , Rahman, H.Y. (2017) *IOP Conference Series: Materials Science and Engineering*



The finite element simulation of electromagnetic powder compaction drive force

Zhou, X. , Liu, J. (2010) *Applied Mechanics and Materials*

View all related documents based on references

References (9)

[View in search results format >](#)

All    [Export](#)     Print     E-mail    [Save to PDF](#)    [Create bibliography](#)

- 
- 1 Yoon, E.Y., Lee, D.J., Ahn, D.-H., Lee, E.S., Kim, H.S.  
**Mechanical properties and thermal stability of bulk Cu cold consolidated from atomized powders by high-pressure torsion**  
  
(2012) *Journal of Materials Science*, 47 (22), pp. 7770-7776. Cited 10 times.  
doi: 10.1007/s10853-012-6569-x  
  
[View at Publisher](#)
- 
- 2 Kipouros, G.J., Caley, W.F., Bishop, D.P.  
**On the advantages of using powder metallurgy in new light metal alloy design**  
  
(2006) *Metallurgical and Materials Transactions A: Physical Metallurgy and Materials Science*, 37 (12), pp. 3429-3436. Cited 25 times.  
doi: 10.1007/s11661-006-1037-3  
  
[View at Publisher](#)
- 
- 3 Rahman, M.M., Rosli, M.H., Namasivayam, D.  
**Effects of sintering schedule on the characteristics of fe-based powder compacts formed through warm compaction route**  
  
(2016) *International Journal of Automotive and Mechanical Engineering*, 13 (1), pp. 3168-3177. Cited 2 times.  
<http://ijame.ump.edu.my/>  
doi: 10.15282/ijame.13.1.2016.4.0264  
  
[View at Publisher](#)
- 
- 4 Mahdi, A.S., Mustapa, M.S., Iajis, M.A., Rashid, M.W.A.  
(2016) *J. Eng. Appl. Sci.*, 11.
- 
- 5 Rahman, M.M., Ariffin, A.K., Nor, S.S.M.  
**Development of a finite element model of metal powder compaction process at elevated temperature**  
  
(2009) *Applied Mathematical Modelling*, 33 (11), pp. 4031-4048. Cited 11 times.  
doi: 10.1016/j.apm.2009.02.005  
  
[View at Publisher](#)
- 
- 6 Rahman, M.M., Nor, S.S.M., Rahman, H.Y.  
**Investigation on the effect of lubrication and forming parameters to the green compact generated from iron powder through warm forming route**  
  
(2011) *Materials and Design*, 32 (1), pp. 447-452. Cited 13 times.  
doi: 10.1016/j.matdes.2010.06.013  
  
[View at Publisher](#)
- 
- 7 Rahman, M.M., Nor, S.S.M., Rahman, H.Y.  
**Effects of lubrication in warm powder compaction process**  
  
(2011) *ASM Science Journal*, 5 (1), pp. 11-18. Cited 3 times.  
[http://www.akademisains.gov.my/download/journal/ASMSJ\\_Vol5\\_No1.pdf](http://www.akademisains.gov.my/download/journal/ASMSJ_Vol5_No1.pdf)
-

□ 8 Cristofolini, I., Menapace, C., Cazzolli, M., Rao, A., Pahl, W., Molinari, A.

The effect of anisotropic dimensional change on the precision of steel parts produced by powder metallurgy

(2012) *Journal of Materials Processing Technology*, 212 (7), pp. 1513-1519. Cited 22 times.  
doi: 10.1016/j.jmatprotec.2012.02.009

[View at Publisher](#)

□ 9 Fang, Z.Z., Wang, H., Kumar, V.

Coarsening, densification, and grain growth during sintering of nano-sized powders—A perspective

(2017) *International Journal of Refractory Metals and Hard Materials*, Part B 62, pp. 110-117. Cited 8 times.  
<http://www.journals.elsevier.com/international-journal-of-refractory-metals-and-hard-materials/>  
doi: 10.1016/j.ijrmhm.2016.09.004

[View at Publisher](#)

© Copyright 2018 Elsevier B.V., All rights reserved.

[< Back to results](#) | 1 of 2 [Next >](#)

[^ Top of page](#)

## About Scopus

[What is Scopus](#)  
[Content coverage](#)  
[Scopus blog](#)  
[Scopus API](#)  
[Privacy matters](#)

## Language

[日本語に切り替える](#)  
[切换到简体中文](#)  
[切换到繁體中文](#)  
[Русский язык](#)

## Customer Service

[Help](#)  
[Contact us](#)

**ELSEVIER**

[Terms and conditions](#) [Privacy policy](#)

Copyright © 2018 Elsevier B.V. All rights reserved. Scopus® is a registered trademark of Elsevier B.V.

Cookies are set by this site. To decline them or learn more, visit our [Cookies page](#).

 RELX Group™