Document details

‹ Back to results | 1 of 2 Next ›

IOP Conference Series: Materials Science and Engineering
Volume 290, Issue 1, 30 January 2018, Article number 012008
International Conference on Advances in Manufacturing and Materials Engineering 2017, ICAMME 2017; International Islamic University Malaysia (IIUM), Gombak CampusKuala Lumpur; Malaysia; 8 August 2017 through 9 August 2017; Code 134404

The role of tin and magnesium in assisting liquid phase sintering of aluminum (Al) (Conference Paper) (Open Access)

Jamal, N.A.[a] ✉, Yusof, F.[b], Nor, Y.A.[c], Othman, M.[a], Khalid, K.[d], Zakaria, M.N.[e,f]

[a]Manufacturing and Materials Engineering (MME) Department, Kulliyyah of Engineering, International Islamic University Malaysia, P.O. Box 10, Kuala Lumpur, Malaysia
[b]Centre of Advanced Manufacturing and Materials Processing (AMMP), Faculty of Engineering, University Malaya, Kuala Lumpur, Malaysia
[c]Biotechnology Engineering Department, Kulliyyah of Engineering, International Islamic University Malaysia, P.O. Box 10, Kuala Lumpur, Malaysia

View additional affiliations ⌄

Abstract

⌄ View references (12)

This study aims to investigate the effect of tin (Sn) and magnesium (Mg) on the sintering response of sintered Al. Although this topic has been extensively reported, details on the combined effect of Sn and Mg that function as sintering additives are still limited. The current study discusses the effect of the combined use of Sn and Mg to assist aluminium (Al) in liquid phase sintering via the powder metallurgy technique. The results demonstrated that the densities of sintered Al increased from 2.5397 to 2.575 g/cm^3 as the Sn content increased from 1.5 to 2.5 wt. % respectively. Accordingly, the physical characteristics of sintered Al were transformed from black to silver, which confirmed the reduction in the oxygen content (oxide layer reduction) from 0.58 to 0.44 wt. % respectively. Additionally, the microstructure of the resultant sintered Al demonstrated that effective wetting by Sn addition was obtained at its maximum content of 2.5 wt. % with a greater micro pores reduction and better metallurgical bonding between Al particles. Therefore, the introduction of different Sn content, along with Mg element, was found to further improve the sintering response of the resultant sintered Al that consequently improved its densities and physical characteristics.

Reaxys Database Information

View Compounds

Indexed keywords

Engineering controlled terms: Liquid phase sintering | Magnesium | Manufacture | Metallurgy | Powder metallurgy | Sintering | Tin

Engineering uncontrolled terms: Aluminum (Al) | Combined effect | Metallurgical bonding | Oxide layer | Oxygen content | Physical characteristics | Powder metallurgy techniques | Sintering additives

Engineering main heading: Aluminum

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

Preliminary development of porous aluminum via powder metallurgy technique: Vorentwicklung von porösem Aluminium durch Pulvermetallurgie

Jamal, N.A. , Maizatul, O. , Anuar, H.
(2018) Materialwissenschaft und Werkstofftechnik

Fabrication and compressive properties of low to medium porosity closed-cell porous Aluminum using PMMA space holder technique

Jamal, N.A. , Tan, A.W. , Yusof, F.
(2016) Materials

Influence of mixing technique on sintering response of binary aluminium alloy powders

Dhokey, N.B. , Athavale, V.A. , Narkhede, N.
(2013) Advanced Materials Letters

View all related documents based on references

Funding details

Funding number	Funding sponsor	Acronym	Funding opportunities
	International Islamic University Malaysia	IIUM	
	International Islamic University Malaysia	IIUM	
	Rigshospitalet		

Funding text

The current work was financially supported by a research initiatives grant (RIGS) of International Islamic University Malaysia (IIUM) under project number of 16-091-0255, which is appreciatively acknowledged.

ISSN: 17578981
Source Type: Conference Proceeding
Original language: English
DOI: 10.1088/1757-899X/290/1/012008
Document Type: Conference Paper
Sponsors:
Publisher: Institute of Physics Publishing

References (12)

View in search results format >

All | Export | Print | E-mail | Save to PDF | Create bibliography

1 Aliyu, I.K., Saheb, N., Hassan, S.F., Al-Aqeeli, N.
Microstructure and properties of spark plasma sintered aluminum containing 1 wt.% SiC nanoparticles (Open Access)

(2015) *Metals*, 5 (1), pp. 70-83. Cited 6 times.
http://www.mdpi.com/2075-4701/5/1/70
doi: 10.3390/met5010070

View at Publisher

2 Gökçe, A., Findik, F.
Effect of waxing on the properties of Al-1Mg P/M alloy

(2011) *Scientific Research and Essays*, 6 (20), pp. 4378-4388. Cited 2 times.
http://www.academicjournals.org/sre/PDF/pdf2011/19Sep/Gokce%20and%20Findik.pdf

View at Publisher

3 Qiu, F., Gao, X., Tang, J., Gao, Y.Y., Shu, S.L., Han, X., Li, Q., (...), Jiang, Q.C.
(2017) *Metals*, 7, pp. 3-8.

4 Mahesh, L., Reddy, J.S.
(2017) *Mechanics and Mechanical Engineering*, 21, pp. 29-36. Cited 3 times.

5 Reddy, S.P., Ramana, B., Reddy, A.C.
(2010) *International Journal of Materials Science*, 5, pp. 777-783. Cited 2 times.

6 Sercombe, T.B., Schaffer, G.B.
On the use of trace additions of Sn to enhance sintered 2xxx series Al powder alloys

(1999) *Materials Science and Engineering A*, 268 (1-2), pp. 32-39. Cited 55 times.
doi: 10.1016/S0921-5093(99)00126-4

View at Publisher

7 Katsuyoshi, K., Tachai, L., Thotsaphon, T., Atsushi, K.
(2007) *Transactions of JWRI*, 36, pp. 29-33. Cited 3 times.

8 MacAskill, I.A., Hexemer Jr., R.L., Donaldson, I.W., Bishop, D.P.
Effects of magnesium, tin and nitrogen on the sintering response of aluminum powder

(2010) *Journal of Materials Processing Technology*, 210 (15), pp. 2252-2260. Cited 34 times.
doi: 10.1016/j.jmatprotec.2010.08.018

View at Publisher

9 Suryanarayana, C.
Mechanical alloying and milling

(2001) *Progress in Materials Science*, 46 (1-2), pp. 1-184. Cited 4972 times.
doi: 10.1016/S0079-6425(99)00010-9

View at Publisher

10 Su, S.S., Chang, I.T.H., Kuo, W.C.H.
Effects of processing conditions on the sintering response of hypereutectic Al-Si-Cu-Mg P/M alloys

(2013) *Materials Chemistry and Physics*, 139 (2-3), pp. 775-782. Cited 8 times.
doi: 10.1016/j.matchemphys.2013.02.031

View at Publisher

11 Katsuyoshi, K., Tachai, L., Thotsaphon, T., Atsushi, K.
(2007) *Transactions of JWRI*, 36, pp. 29-33. Cited 3 times.

12 Jha, N., Mondal, D.P., Dutta Majumdar, J., Badkul, A., Jha, A.K., Khare, A.K.
Highly porous open cell Ti-foam using NaCl as temporary space holder through powder metallurgy route

(2013) *Materials and Design*, 47, pp. 810-819. Cited 73 times.
doi: 10.1016/j.matdes.2013.01.005

View at Publisher