

## Accepted Manuscript

Metal Injection Moulding of Titanium and Titanium Alloys: Challenges and Recent Development

Ali Dehghan-Manshadi, Michael Bermingham, Matthew Dargusch, David StJohn, Ma Qian

PII: S0032-5910(17)30512-0  
DOI: doi:[10.1016/j.powtec.2017.06.053](https://doi.org/10.1016/j.powtec.2017.06.053)  
Reference: PTEC 12629

To appear in: *Powder Technology*

Received date: 19 April 2017  
Revised date: 20 June 2017  
Accepted date: 21 June 2017



Please cite this article as: Ali Dehghan-Manshadi, Michael Bermingham, Matthew Dargusch, David StJohn, Ma Qian, Metal Injection Moulding of Titanium and Titanium Alloys: Challenges and Recent Development, *Powder Technology* (2017), doi:[10.1016/j.powtec.2017.06.053](https://doi.org/10.1016/j.powtec.2017.06.053)

This is a PDF file of an unedited manuscript that has been accepted for publication. As a service to our customers we are providing this early version of the manuscript. The manuscript will undergo copyediting, typesetting, and review of the resulting proof before it is published in its final form. Please note that during the production process errors may be discovered which could affect the content, and all legal disclaimers that apply to the journal pertain.

# Metal Injection Moulding of Titanium and Titanium Alloys: Challenges and Recent Development

Ali Dehghan-Manshadi<sup>a\*</sup>, Michael Bermingham<sup>a</sup>, Matthew Dargusch<sup>a</sup>, David StJohn<sup>a</sup> and Ma Qian<sup>a,b\*</sup>

<sup>a</sup> Queensland Centre for Advanced Materials Processing and Manufacturing (AMPAM)  
School of Mechanical and Mining Engineering, The University of Queensland, St Lucia,  
QLD 4072

<sup>b</sup> School of Engineering, Centre for Additive Manufacturing, RMIT University, Melbourne,  
VIC 3000, Australia

\*Corresponding Authors: [a.dehghanmanshadi@uq.edu.au](mailto:a.dehghanmanshadi@uq.edu.au); [ma.qian@rmit.edu.au](mailto:ma.qian@rmit.edu.au)

## Abstract

Metal Injection Moulding, MIM, is a well-developed net or near-net shape manufacturing technique for stainless steel, copper and ceramic materials. This process has received increasing attention over the last decade as a promising technique for the manufacture of intricate titanium parts for a range of applications in biomedical, aerospace, automotive and other industries. Historically, the necessity to use expensive fine sized spherical (<45  $\mu\text{m}$ ), low-oxygen titanium powder has hindered the industrial application of titanium MIM from an economic perspective. However, recent efforts have shown promise in adapting low-cost non-spherical hydride-dehydride (HDH) titanium powder in the MIM process. HDH powder is considerably less expensive than fine spherical powder and thus there is significant potential in expanding the number of titanium MIM applications. This paper reviews recent developments in MIM of titanium and its alloys as well as the outstanding challenges with a special focus on MIM of HDH titanium powder.

**Keywords:** metal injection moulding; titanium; sintering; porosity; density; microstructure.

Download English Version:

<https://daneshyari.com/en/article/4915013>

Download Persian Version:

<https://daneshyari.com/article/4915013>

[Daneshyari.com](https://daneshyari.com)