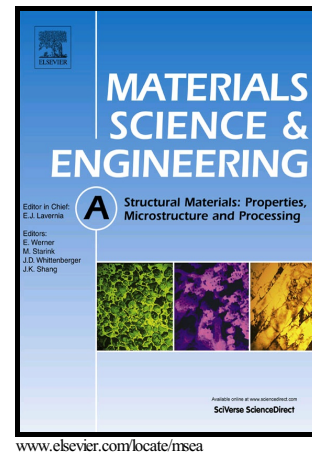


# Author's Accepted Manuscript

Microstructure evolution and superior tensile properties of low content Graphene nanoplatelets reinforced pure Ti matrix composites

X.N. Mu, H.M. Zhang, H.N. Cai, Q.B. Fan, Z.H. Zhang, Y. Wu, Z.J. Fu, D.H. Yu



PII: S0921-5093(17)30098-9  
DOI: <http://dx.doi.org/10.1016/j.msea.2017.01.072>  
Reference: MSA34634

To appear in: *Materials Science & Engineering A*

Received date: 25 October 2016  
Revised date: 21 January 2017  
Accepted date: 21 January 2017

Cite this article as: X.N. Mu, H.M. Zhang, H.N. Cai, Q.B. Fan, Z.H. Zhang, Y. Wu, Z.J. Fu and D.H. Yu, Microstructure evolution and superior tensile properties of low content Graphene nanoplatelets reinforced pure Ti matrix composites, *Materials Science & Engineering A* <http://dx.doi.org/10.1016/j.msea.2017.01.072>

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 galley proof before it is published in its final citable 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.

# Microstructure evolution and superior tensile properties of low content Graphene nanoplatelets reinforced pure Ti matrix composites

X.N. Mu <sup>a</sup>, H.M. Zhang <sup>a\*</sup>, H.N. Cai <sup>a</sup>, Q.B. Fan <sup>a</sup>, Z.H. Zhang<sup>a</sup>, Y. Wu<sup>a</sup>, Z.J. Fu <sup>a</sup>, D.H. Yu <sup>a</sup>

<sup>a</sup>National Key Laboratory of Science and Technology on Materials under Shock and Impact, School of Materials Science and Engineering, Beijing Institute of Technology, Beijing 100081, China

**Abstract:** Titanium matrix composites with the discontinuous reinforcement of graphene nanoplatelets (GNPs) were produced by powder metallurgy and subsequent hot-rolling. In the process of spark plasma sintering (SPS), the GNPs were well preserved at low temperature and high compressive pressure. Hot-rolling process was applied to improve the microstructure and properties of the GNPs-Ti matrix composites. The GNPs were uniformly distributed and arranged along with the rolling direction (RD). Also, the GNPs blocked slipping so that the matrix generated  $\{10\bar{1}1\}$   $\langle 10\bar{1}2 \rangle$  compressive twinning to be compatible with deformation in the rolling process with the increase of GNPs content. Tensile strength test demonstrated an excellent ultimate tensile strength that was 54.2% higher than pure titanium with merely 0.1wt% GNPs addition. The strengthening mechanism of composites was discussed by three main strengthening factors combined with a modified load transfer model and it was thought that the composites were strengthened by grain refinement, load transfer from Ti matrix to GNPs and texture strengthening.

Download English Version:

<https://daneshyari.com/en/article/5456252>

Download Persian Version:

<https://daneshyari.com/article/5456252>

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