

Accepted Manuscript

Title: Structure and properties of titanium produced by a new method of chip recycling

Authors: Krzysztof Topolski, Włodzimierz Bochniak, Marek Łagoda, Paweł Ostachowski, Halina Garbacz



PII: S0924-0136(17)30169-3
DOI: <http://dx.doi.org/doi:10.1016/j.jmatprotec.2017.05.005>
Reference: PROTEC 15213

To appear in: *Journal of Materials Processing Technology*

Received date: 8-11-2016
Revised date: 24-3-2017
Accepted date: 5-5-2017

Please cite this article as: Topolski, Krzysztof, Bochniak, Włodzimierz, Łagoda, Marek, Ostachowski, Paweł, Garbacz, Halina, Structure and properties of titanium produced by a new method of chip recycling. *Journal of Materials Processing Technology* <http://dx.doi.org/10.1016/j.jmatprotec.2017.05.005>

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.

Structure and properties of titanium produced by a new method of chip recycling

Krzysztof Topolski^{1a)}, Włodzimierz Bochniak²⁾, Marek Łagoda²⁾, Paweł Ostachowski²⁾,

Halina Garbacz^{1b)}

¹⁾ Faculty of Materials Science and Engineering, Warsaw University of Technology, Wołoska 141,
02-507 Warsaw, Poland

²⁾ Department of Structure and Mechanics of Solids, AGH University of Science and Technology, Al.
Mickiewicza 30, 30-059 Kraków, Poland

^{a)} email: kt.topolski@gmail.com, phone (+48) 22 2348740

^{b)} email: hgarbacz@inmat.pw.edu.pl, phone (+48) 22 2348792

Abstract. The paper proposes a new technique of recycling metallic chips and presents the results of examination of the products thus obtained. The aim of the experiments was to recycle commercial purity (cp) titanium Grade 2 chips obtained by turning, and to produce a solid bulk material. The recycling was realized using a plastic working process. The titanium chips were first subjected to preliminary consolidation and then directly extruded using the KOBOL process. The properties of the recycling final product were examined and compared with those of the as-received, solid cp-titanium Grade 2 (reference material).

The recycling process yielded a well consolidated solid titanium rod with a diameter of 8mm. The consolidation effect was high which was confirmed by the fact that only a small number of voids and discontinuities distributed randomly were observed. The final material had a homogeneous grained structure. The equiaxial grains observed on the transverse and longitudinal sections had similar sizes. The mechanical properties of the recycled material (estimated based on the results of microhardness measurements and uniaxial compression tests) were comparable with those of solid cp-titanium Grade 2.

Keywords: recycling; titanium; chips; plastic forming; KOBOL method

Download English Version:

<https://daneshyari.com/en/article/5017988>

Download Persian Version:

<https://daneshyari.com/article/5017988>

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