

Review Report on Habilitation Thesis of PhDr. RNDr. Josef Stráský, Ph.D., entitled Advanced Titanium Alloys for Medical Applications

The Habilitation Thesis of PhDr. RNDr. Josef Stráský, Ph.D., summarizes his activity in the field of the development of a new titanium based alloy for medical applications. A special attention is paid to its mechanical properties and severe plastic deformation. The Thesis is composed of the set of 14 original and review papers of the candidate, published in impacted international journals, conference proceedings and also as 2 chapters in edited books. Although these papers occurred in cooperation of authors' teams, the contribution of the candidate is significant or even decisive. The papers are commented and summarized showing in majority of cases the contribution of the candidate.

Introduction of the Thesis provides insight into Ti based alloys. They are classified and their properties such as phase transformations and mechanical properties with focus on strengthening mechanisms are discussed. Let us mention that the mechanical properties of materials aimed for implants must fulfill very specific requirements – one of them is that the elastic modulus should be similar to that of the bone. A special attention is paid to Ti as implant material and on severe plastic deformation of Ti alloys providing materials with ultra-fine-grained (UFG) structure.

The papers are divided into two Parts, (i) Development of Ti-Nb-Ta-Zr-O Biomedical Alloys, and (ii) Ultra-fine-grained Ti Alloys for Biomedical Use. The research described in the former Part describes the properties of new biomedical Ti alloy which predestines it for early medical applications. The latter Part offers new possibilities of materials such as Ti alloys exhibiting UFG structure. It is worth of mentioning that the research of the candidate was realized both in close cooperation with Ufa State Aviation University, the top research center in the field, and together with Ph.D. students of the candidate. I am convinced that this cooperation contributed substantially to their professional growth.

The Thesis and mainly the attached papers unambiguously show that Dr. Stráský significantly contributed to the research of metallurgical aspects of Ti alloys.

The Thesis is constructed didactically and also shows pedagogic ability of the candidate. It is written in English. As I am not English native, I will not comment the language side of the Thesis. The check with the system Turnitin revealed quite high level of the similarity, however, mainly in the titles/text of the published papers being a high portion of the Thesis, University and Department titles. I did check it carefully and do not see any plagiarism.

I have no serious comments and questions to the Thesis. An ambiguity of using the term “chapter” for both the part of the Thesis and the paper published in the edited book is little bit confusing, and the use of different fonts (normal, italics...) for symbols (phase α) represent only negligible “fly in the ointment”.

Conclusion:

It is possible to pronounce unambiguously that the submitted Habilitation Thesis provides original results and its content expresses scientific as well as pedagogic qualification of the candidate. It fulfills all conditions demanded on the Habilitation Thesis by the law 111/98 Sb. of the Czech Republic. **Therefore, I recommend this Thesis to proceed the procedure and after successful defense to suggest the appointment of PhDr. RNDr. Josef Stráský, Ph.D., for the *Associate Professor (docent in Czech)*.**

Prague, February 22, 2021



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