

Postdoc (Assistant Professor) position in the research project NCN OPUS 18

“Yield Surface Identification of Functional Materials and Its Evolution Reflecting Deformation History under Complex Loadings”

INSTITUTION: **Instytut Podstawowych Problemów Techniki PAN**
LOCATION: **Warszawa**
POSITION: **Postdoc (Assistant Professor)**
DATE of ANNOUNCEMENT: **July 24th, 2020**
SUBMISSION DEADLINE: **September 11th, 2020**
KEY WORDS: **plasticity, complex loadings, yield surface, fatigue, deformation history**

We are offering Postdoc (Assistant Professor) position in Department of Experimental Mechanics, IPPT PAN.

PROJECT INFORMATION

Principal Investigator: **Professor Zbigniew L. Kowalewski, PhD, DSc, Eng.**
Founding body: **National Centre of Science in Poland**
Project type: **OPUS**
Project duration: **36 months**

PROJECT OBJECTIVES

The proposed project is devoted to mechanical and fracture characterization of metallic layered composites (MLC): aluminum–copper and titanium–copper bimetals. The objective of the research is to study the main physical mechanisms responsible for the plastic deformation resulting from the complex mechanical loadings. The materials will be tested in the as-received state and after prior deformation due to monotonic or cyclic loading. The yield surface concept will be used to identify an initial texture of the tested materials and subsequent modifications of their properties by its evolution due to loading history induced.

A numerical model elaborated on the basis of experimental data will reflect an influence of different deformation histories. Finite Element Method will be used in calculations.

The qualified Candidate will be involved in conducting research on layered materials, developing their results, developing a model for the behaviour of tested materials reflecting initiation and further development of damage.

MAIN TASKS AND TECHNIQUES

Two unique complementary testing systems will be used for the characterization of mechanical properties and damage evolution: a testing machine for simultaneous loading of thin-walled tubular specimens by means of axial force, torque and internal pressure, and a modern machine for material testing on cruciform specimens, ensuring the implementation of tests in a plane stress state resulting from simultaneous action of axial forces in two mutually perpendicular directions. In addition, two optical systems will be used: digital image correlation (DIC) and electronic speckle pattern interferometry (ESPI), especially useful for identification of specimen damage initiation and its further development, particularly in the field of cyclic loading. In order to effectively visualize changes in the stress state of the tested materials subjected to the loading history defined, the concept of yield surface will be used.

An important issue of the project will be the modelling of deformation and degradation mechanisms taking into account processes associated with local micro-plasticity. The finite element method coupled

with the Chaboche model will be the starting point for simulation of the behaviour of the tested materials at low cycle fatigue.

REQUIREMENTS FOR CANDIDATE

- PhD in technical sciences in the field of mechanics or materials science
- fluent skills in spoken and written English
- strong motivation to conduct scientific work
- publications reflecting the profile and scientific achievements
- desirable knowledge of the fundamentals of material mechanics, computer programming and the finite element method within the subject of the project
- ability to work independently
- fulfillment of the requirements adopted at the IPPT PAN when employed in scientific positions

https://www.ippt.pan.pl/attachments/rada-naukowa/2019-02-28uchwala_zatrudnianie_zasady.pdf

CONDITIONS OF EMPLOYMENT

Type of employment: **contract of employment on specified time**

Salary: **about 8000 PLN/month (~2000 EURO/month)**

Time of employment: **36 months**

Planned date of employment: - **October 1st, 2020**

REQUIRED DOCUMENTS

1. CV containing list of publications, reports and other achievements
2. Copy of the PhD diploma
3. Motivation letter
4. Contact addresses to 2 scholars who would be able to provide research opinions on the candidate
5. Please include in your CV the following clause: "I agree to the processing of personal data contained in my job offer for the needs necessary to carry out the recruitment process conducted by IPPT PAN with headquarters in Warsaw, ul. A. Pawińskiego 5B, according to art. 13 para. 1 and 2 of Regulation (EU) 2016/679 of the Parliament and of the Council of 27 April 2016 on the protection of individuals with regard to the processing of personal data and the free movement of such data and the repeal of Directive 95/46 / EC (RODO).

The documents should be sent till **September 11th, 2020** to the HR Office: kadry@ippt.pan.pl with copies to Project PI, prof. Zbigniew L. Kowalewski; zkowalew@ippt.pan.pl and to Department Secretary Ms. Agnieszka Sokalska alyszk@ippt.pan.pl

If needed the candidates will be contacted and invited for the interview. The final decisions will be taken before **October 1st, 2020**