Kratek opis usposabljanja mladega raziskovalca (*Short description of the Young Researcher's training)*

1. Raziskovalna organizacija (*Research organisation)*:

Univerza v Ljubljani, Naravoslovnotehniška fakulteta

2. Ime, priimek in elektronski naslov mentorja (*Mentor's name, surname and email*):

Boštjan Markoli, bostjan.markoli@omm.ntf.uni-lj.si

3. Šifra in naziv raziskovalnega področja (*Research field*):

2.10 Proizvodne tehnologije in sistemi, 2.10.02 Izdelovalne tehnologije

4. Kratek opis usposabljanja mladega raziskovalca (*Short description of the Young Researcher's training)*:

Navedite tudi morebitne druge zahteve, vezane na usposabljanje mladega raziskovalca (npr. znanje tujih jezikov, izkušnje z laboratorijskim delom, potrebne licence za usposabljanje…).

slo:

Usposabljanje mladega raziskovalca bo vezano na razvoj nove izdelovalne tehnologije za serijo zlitin na osnovi zlitinskega sistema Al-Mn, katerim je mogoče načrtovano spreminjati mehanske in druge lastnosti. Pri tem bo kandidat raziskoval in optimiral izdelovalno tehnologijo zlitin utrjenih s kvazikristali, kjer bo uporabil metodo in-situ nastanka kvazikristalov v različnih zlitinah na osnovi Al-Mn. V ospredju bo način obdelave taline pred litjem in sicer bo šlo za sprožanje nadzorovane tvorbe kvazikristalov preko modifikacije s pomočjo različnih inokulantov. Pri tem o kandidat zasledoval vpliv procesnih parametrov na uspešnost postopka nadzorovane tvorbe kvazikristalov, kot so temperatura litja, delež, oblika in porazdelitev inokulanta, čas zadrževanja taline pred ulivanjem ter testiral primernost razvitih zlitin za ulivanje na strip-casterju ali kontinuirno litje, ki se sicer uporablja za izdelovanje pločevine.

Kandidat mora poznati vpliv osnovnih fizikalno-metalurških parametrov strjevanja večkomponentnih zlitin in njihov vpliv na tvorbo kvazikristalov v zlitinah, vpliv in delovanje inokulantov na in-situ tvorbo kvazikristalov in vpliv teh faz na mehanske lastnosti. Prav tako mora poznati osnovne značilnosti zgradbe kvazikristalov, njihove interakcije s kristalno matrico ter vpliv na mehanske in druge lastnosti zlitin na osnovi zlitinskega sistema Al-Mn.

Kandidat mora izkazovati inovativnost, sposobnost za timsko delo, komunikativnost, splošna znanja o uporabi računalniških orodij, smisel za organizacijo lastnega dela in dela raziskovalne skupine, znanje slovenskega in angleškega jezika. Poleg tega so nujna tudi naslednja specifična znanja. Znanje in izkušnje na področju sinteze kovinskih materialov. Obvladovanje priprave vzorcev (predvsem kovinskih materialov) za svetlobno mikroskopijo, SEM (vrstično elektronsko mikroskopijo) ter rentgensko difrakcijo in obvladovanje priprave vzorcev za presevno elektronsko mikroskopijo. Usposobljenost za delo s programskim orodjem ThermoCalc, SEM (vrstični elektronski mikroskop) ter metodami EDS in EBSD ter usposobljenost za delo s TEM (presevni elektronski mikroskop). Potrebna je tudi usposobljenost za interpretacijo eksperimentalnih rezultatov na osnovi svetlobne mikroskopije, SEM, EDS, EBSD, TEM in rentgenske difrakcije.

eng:

The training of young researchers will be linked to the development of new production technologies for the Al-Mn alloy series, which can have their mechanical properties can be changed. In doing so, the candidate will work on research and optimization of production technology of quasicrystalline-hardened alloys, where he will use the method of in-situ formation of quasicrystals in various alloys based on Al-Mn. In the forefront, there will be the modification of melt prior to casting via triggering the controlled formation of quasicrystals via modifications using various inoculants. In doing so, the candidate will pursue the influence of process parameters on the success of the process of controlled formation of quasicrystals, such as casting temperature, shape, amount and distribution of inoculant, melt retention time, and test the suitability of developed alloys for strip-casting or continuous casting, which are commonly used to make sheet metal.

Candidate must have significant knowledge of basic physico-metallurgical parameters of solidification of multicomponent alloys and their effects on the formation of quasicrystals in alloys, influence on the use of inoculants on in-situ formation of quasicrystals and the influence of these phases on mechanical properties. He must also be familiar with the basic structures of quasicrystals, their interactions with the crystal matrix and the influence on mechanical and other properties of alloys based on the Al-Mn system.

Candidate must demonstrate innovativeness, ability for teamwork, communication, general knowledge of the use of computer tools, a sense of organization of his work activities and that of research group, knowledge of Slovene and English. In addition, the following specific skills are also essential. Knowledge and experience on the synthesis of metallic materials. Mastering the preparation of samples (mainly metallic materials) for light microscopy, SEM (scanning electron microscopy), and X-ray diffraction and mastering the preparation of samples for transmission electron microscopy. Proficiency in working with ThermoCalc software, SEM (scanning electron microscope) and EDS and EBSD methods and abilityn for working with TEM (transmission electron microscope). Experience is also needed to interpret the experimental results based on light microscopy, SEM, EDS, EBSD, TEM and X-ray diffraction.