BEHERA SRINIVAS

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Profile:

- My professional and researched experience is focused on the diverse field of "Deformation behavior of nanostructured FCC materials via experimentation and modeling approach."
- Hands-on experience in various experimental techniques such as Thermomechanical processing (cryorolling, asymmetric rolling), Postprocess heat treatment, Microstructural characterization by optical microscope, TEM, SEM + EBSD, XRD, Tool design, and fabrication.
- Skilled in deformation behavior modeling, size effect modeling, materials modeling with microstructure, postmortem analysis of deformation mechanism, and crystallographic texture analysis.
- Strong presentation and technical writing skills, multi-tasking, teamwork, and problem-solving capability.
- Software proficiency: CAD modeling (Creo, Solidworks, AutoCAD), Python, Numerical modeling and graphing (MatLab, OriginPro), Microstructural analysis (Xpert, TSL-OIM), Image processing.

Education:

M.S. and Ph.D. dual degree (2013-2021) | Indian Institute of Technology Madras
Manufacturing Engineering Section, Department of Mechanical Engineering (CGPA = 8.07/10)
Project Title: ***Deformation Behavior of Cryo-manufactured Bulk Nanostructured Materials: An Experimental and Modelling Approach***
Guide: Dr. S.K. Panigrahi

Bachelor's in technology (2009-2013) | Maheshwara Engineering College, Hyderabad (affiliated: JNTUH), Department of Mechanical Engineering (80%)

Research Experience:

Masters and Doctoral Research, IIT Madras, 2013-2021

Summary

In summary, my work consists of designing complex nanostructured microstructures (FCC materials, i.e., Cu, Al, and Cu-Be alloy) by cryodeformation, advanced TEM-based characterization, mathematical models to predict the microstructural phenomena responsible for the deformation behavior of nanostructured materials during different strain rates (Quasi-static to high-speed deformation) and temperatures (room to subzero temperatures). The developed models are unique and can be considered a benchmark to establish the co-relationship between microstructural evolution in nanostructured materials and the structure properties co-relationship of FCC materials with varying stacking fault energies.

Post-doctoral Research, IIT Madras, 2021-2023

My PDF research is focused on solving two major problem statements:

1. Developing fundamental theory for the microscale deformation mechanism in Mg alloys. The work consists of extensive use of the SEM-EBSD-based characterization technique to establish the flow behavior in Mg materials during micro-extrusion.
2. Developing the first principle approach to understanding the fatigue behavior in Mg alloy

Research Output:

Journal Publications:

1. **B. Srinivas**, A. Dhal, and S. K. Panigrahi, "Mathematical prediction of the role of stacking fault energy on the deformation mechanism and strength of FCC materials at different levels of deformation strain," International Journal of Plasticity, Elsevier 2017 vol 97/159-177.
2. **B. Srinivas**, S.K. Panigrahi, A phenomenological model based on nanostructured dislocation cluster interactions to predict the work hardening behavior of cryodeformed materials, International Journal of Plasticity, Elsevier (2020) 102772.
3. **B. Srinivas**, S.K. Panigrahi, Role of twin fraction on the hardening stage in cryodeformed FCC materials, Material Science and Engineering A, Volume: 833, Article no: 142454, Year: 2022.
4. **B. Srinivas**, S.K. Panigrahi, G. Racineux, and S. Marya, A novel mathematical-based approach to predict the high-speed deformation behavior of cryodeformed materials with varying stacking fault energies, European Journal of Mechanics - A/Solids, Elsevier (under review).
5. **B. Srinivas**, S.K. Panigrahi, A mathematical model to predict the microstructure evolution at cryogenic temperature for cryodeformed FCC materials, European Journal of Mechanics - A/Solids, Elsevier (under review)
6. V. Parmar, K. Changela, **B. Srinivas**, M.M. Sankar, S. Mohanty, S.K. Panigrahi, K. Hariharan, D. Kalyanasundaram, Relationship between dislocation density and antibacterial activity of cryo-rolled and cold-rolled copper, Materials (Basel). 12 (2019) 1–11.

Conference Presentations:

1. **B. Srinivas** and S. K. Panigrahi, "A mathematical model to predict the influence of deformation strain and temperature on work-hardening potential of ultra-fine-grained material", Nano SPD 07 (2017) (oral presentation)
2. **B. Srinivas** and S. K. Panigrahi, "Development of a mathematical model to predict the nucleation of dynamic recovery in nanostructured FCC materials", THERMEC-2018 (oral presentation).
3. **B**. Srinivas, C. Srinivasu, B. Mahesh, M. Aqheel, A review on severe plastic deformation, Int. J. Adv. Mater. Manuf. Charact. 3 (2013) 291–295. https://doi.org/10.11127/ijammc.2013.02.053.

Major Coursework Taken:

- Plasticity and plastic deformation
- Sheet metal forming
- Texture in materials
- Mechanical behavior of materials
- Grain boundary engineering