DR. MUHAMMAD SADIQ KHATTAK (GOLD MEDALIST)

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Profile:

Dr. Sadiq Khattak has a vast experience in the field of Energy Efficient Systems, HVAC, Elevators Technology and smart MEP Systems for various industrial applications. He remained the Project Manager for the first-ever University of Technology for the Engineering Technology Programs. The University is well established and currently comprised of 4 Engineering Technology Programs at Nowshera. Dr. Khattak remained the Project Director for the "Establishment of Jalozai Campus of UET Peshawar", an ECNEC project worth PKR. 8 Billions. Dr. Khattak is already convening several committees at the National Technology Council, HEC Islamabad for uplifting the Engineering Technology Programs. He is actively involved in reviving the National Curriculum for Mechnaical Engineering Technology.

Dr. Muhammad Sadiq Khattak has completed his Post Doctorate Studies from the Georgia Institute of Technology, Atlanta USA in 2012. During his Post Doctorate, he was working on an EU project with a consortium of 10 multinationals both in Europe and USA. He has got a wide experience in developing the experimental techniques for testing the reliability of Rare-Earth (RE) doped tertiary (Sn) based lead-free solder alloys for high temperature microelectronics applications in severe environment.

Dr. Sadiq Khattak is highly honored to complete successfully his double doctorate studies in Nanotechnology and Energy & Mechanics of Materials from the Georgia Institute of Technology (GIT), Atlanta, USA and University of Lorraine (UOL), Lorraine, France respectively. Before that, he completed double MS studies in Mechanical Engineering from the Georgia Institute of Technology, Atlanta, USA in 2009 and in Mechanics of Materials from the University of Lorraine, Lorraine, France in 2008. He got the best PhD student award from GIT. He has a rich teaching experience in different research labs and institutes both in Europe and USA. He also got some break-through results from his research during (both of his PhDs) including indentifying elemental Lanthanum in Sn-Ag-Cu alloys for the first time in solder joints. He has published his work in high impact factor Journals and International Conferences in Europe and USA. He has attended more than 15 international workshops across the globe.

Lead-based solders were widely used for a long time in almost all types of microelectronics solder joints. However, after RoHS and EPA legislations, lead has been banned from all types of solder joints due to its hazardous nature. Dr. Sadiq Khattak was involved to develop green technology for the new generation of microelectronics applications in the world of highly demanding miniaturized microelectronics. The main idea was to replace the lead-based solders with lead-free in order to reduce the lead-wastage in discarded microelectronics which strongly degrades the environment, agriculture, drinking water and ultimately causes many major diseases.

During functioning, the microstructure of solder joints coarsens and hence their properties degrade with time. This strongly affects the joints life and hence deteriorates the structural integrity of entire component. During his research, Dr. Sadiq Khattak has developed the experimental techniques including highly sophisticated microscopy, Nanoindentation, Wetting balance tests and in-situ microscopy for complete characterization of solder joints including thermal coarsening, wettability, creep analysis and individual phase mechanical properties of different RE doped compositions of Sn based tertiary alloys.

The emergence of this new class of materials creates a great need for modeling and large-scale simulations to bridge the gap between the information given at the atomic level and the bulk properties of these materials when used to build industrial applications. Due to lack of better knowledge from systematic experimental procedures, some fundamental features of nonconventional solder materials with a possible interest for industrial applications can be explained by multiscale modeling framework with a good descriptive and predictive capabilities. Thus, having the high importance of multiscale modeling, Dr. Sadiq Khattak has also worked to develop the multiscale models to investigate the atomic scale behavior of lead-free solders and develop the scale transitions from nano-level to the macro level.