

## KIRAN KUMAR ADEPALLI

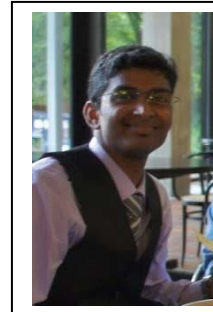
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### PERSONAL DETAILS:

Name : KIRAN KUMAR  
Family Name : ADEPALLI  
Date of Birth : 31<sup>st</sup> Jan 1983  
Gender : Male  
Nationality : Indian  
Languages known : English, Telugu, Hindi and German (A1.1)



### EDUCATIONAL BACKGROUND:

Degree / Certificate	Year	Institute	Percentage or Grading points
PhD	06/2013	Max Planck Institute for Solid State Research, Stuttgart	1.0 (sehr gut)
M.E (Materials Engg.)	06/2008	Indian Institute of Science (IISc), Bangalore	6.6/8.0 ( in Courses) 8.0/8.0 ( in Research)
B.Tech (Metallurgical and Materials Engg.)	04/2006	National Institute of Technology (NITW), Warangal	84.67 %

### RESEARCH FELLOWSIPS and GRANTS:

- ❖ National Science Foundation and Department of Energy on projects related to solid oxide fuel cells and memristors.
- ❖ International Max Planck Research School Fellowship (2009-2012).
- ❖ Project Associate (July 2008- July 2009) at Electronic packaging and Interdiffusion lab, Dept. of Materials Engineering, IISc, India., for the following projects.
- ❖ Summer fellowship to do a live project at Visakapatnam steel Plant, India.

### WORK EXPERIENCE:

- ❖ 2013-present: Postdoctoral associate at Massachusetts Institute of Technology, Cambridge, USA: Independently leading projects on mechanical and electrical effects on energy conversion and information storage, respectively.
- ❖ 2009-2012: Research employee at Max Planck Institute, Stuttgart, Germany: Independently lead couple of projects on understanding electrical properties of wide band gap oxides under the influence of extended defects.
- ❖ 2008-2009: Project associate in Electronic packaging and Interdiffusion lab, IISc, India, lead two projects in the area of solid state diffusion studies in electronic packaging materials – Au-Ti system and A15 compounds for superconductors.
- ❖ 2003 summer: Visakhapatnam steel plant, India – worked on optimization of hot blast stoves for efficient heat exchange.
- ❖ 2001: Six month internship at MIDHANI, Hyderabad – a superalloys manufacturer for India's space mission.
- ❖ 2001: Six month internship at Ordinance factory, Medak – an Indian defense factory for precision investment casting techniques.

## RESEARCH SKILLS:

- ❖ Point defect modeling and diffusion related studies
- ❖ Electrochemical characterization techniques – Impedance spectroscopy, cyclic voltammetry
- ❖ Scanning probe microscopes - STM/STS, AFM
- ❖ Scanning and transmission electron microscopy
- ❖ Various surface and bulk characterization tools – e.g. XPS, XRD, SIMS, EELS, EDAX
- ❖ Bicrystals preparation – optical floating zone technique
- ❖ Ceramics synthesis and processing – conventional, spark plasma sintering (SPS)
- ❖ Mechanical characterization techniques – nano-indentation, compression, tensile tests, creep tests

## RESEARCH PROJECTS DESCRIPTION:

- ❖ 2012-2014 (at MIT): Ionic and electronic transport under mechanical and electrical effects in materials for energy conversion (fuel cells) and information storage (memristors).
- ❖ 2009-2012 (PhD): Influence of extended defects on the electrical properties of TiO<sub>2</sub>
- ❖ 2006-2009 (Masters): Study on interdiffusion and growth of Nb<sub>3</sub>Sn superconductor with A15 structure and other interconnects for electronic packaging.
- ❖ 2002-2006 (Bachelors): Determination of kinetic parameters of precipitation and dissolution reactions in a 7017 Al-Zn-Mg alloy from Differential Scanning Calorimetric (DSC) studies

## SCIENTIFIC PUBLICATIONS:\*

1. **A.K. Kumar**, T. Laurila, V. Vuorinen and A. Paul, Determination of diffusion parameters and activation energy of diffusion in V<sub>3</sub>Si phase with A15 crystal structure, *Scripta Materialia*, **60** (2009) 377.
2. K.S. Ghosh, **A.K. Kumar** and M.K. Mohan, Calorimetric Studies and Kinetic Parameters of Solid State Reactions in 7017 Al-Zn-Mg Alloy, *Trans. Indian Inst. Metals.*, **61** No.6, (2009) 487.
3. **A.K. Kumar** and A. Paul, Interdiffusion and growth of the superconductor Nb<sub>3</sub>Sn in Nb/Cu(Sn) diffusion couples, *Journal of Electronic Materials*, **38** (2009) 700.
4. **A.K. Kumar** and A. Paul, Interdiffusion and activation energy in Ti<sub>3</sub>Au phase with A15 crystal structure, *Intermetallics*, **17** (2009) 962.
5. **A.K. Kumar**, T. Laurila, V. Vuorinen and A. Paul, Study on the growth of Nb<sub>3</sub>Sn superconductor in Nb/Cu(Sn) diffusion couples, *Defect and Diffusion Forum*, **297-301** (2010) 467.
6. R. Ravi, **A.K. Kumar** and A. Paul, Diffusion studies in A<sub>3</sub>B compounds with A15 structure, *Defect and Diffusion Forum*, **297-301** (2010) 477.
7. **A.K. Kumar** and A. Paul, Interdiffusion studies in bulk Au-Ti system, *Journal of Material Science*, **21** (2010) 1202.
8. T. Laurila, V. Vuorinen, **A.K. Kumar**, and A. Paul, Diffusion and growth mechanism of Nb<sub>3</sub>Sn superconductor grown by bronze technique, *Applied Physics Letters*, **96** (2010) 231910.
9. **K.K. Adepalli**, M. Kelsch, R. Merkle and J. Maier, Influence of line defects on the electrical properties of single crystal TiO<sub>2</sub>, *Advanced Functional Materials*, **23** (2013) 1798.
10. **K.K. Adepalli**, M. Kelsch, R. Merkle and J. Maier, Enhanced ionic conductivity in polycrystalline TiO<sub>2</sub> by “one-dimensional doping”, *Physical Chemistry Chemical Physics*, DOI: 10.1039/C3CP55054K.
11. **K.K. Adepalli**, M. Kelsch, R. Merkle and J. Maier, Dislocation effects on the electrical properties of Y<sub>2</sub>O<sub>3</sub> doped / decorated polycrystalline TiO<sub>2</sub>, (*in review J. Phys. Chem. C*, 2014).
12. **K.K. Adepalli**, F. Phillipp, R. Merkle, P.A. van Aken and J. Maier, Electrical and structural characterization of  $\Sigma 5$  and low angle tilt grain boundaries in undoped and Y decorated TiO<sub>2</sub>, (submitted to *Advanced Interface materials*, 2014).
13. **K.K. Adepalli**, M. Moors, Q. Lu, A. Wedig, K. Skaja, B. Arndt, B. Yildiz, R. Dittmann, R. Waser and I. Valov, Investigating resistive switching phenomena on SrRuO<sub>3</sub> and TaO<sub>x</sub> thin films with scanning tunneling microscopy, (Submitted to *Nano letters*, 2014).
14. A. Wedig, M. Luebben, D-Y. Cho, M. Moors, K. Skaja, V. Rana, T. Hasegawa, **K. K. Adepalli**, B. Yildiz, R. Waser and I. Valov, Nanoscale cation motion in TaO<sub>x</sub>, HfO<sub>x</sub> and TiO<sub>x</sub> memristive systems reveals fundamentally different switching models, (Submitted *Nature Nanotechnology*, 2014).

**Kiran Kumar Adepalli**

\* Change in presentation of author's name later to 2011 (K.K. Adepalli and A.K. Kumar are the same)