

# Sascha POPULOH

## Personal details:

Nationality: German  
Date of birth: August 4<sup>th</sup>, 1979  
Birthplace: Beckum, Germany  
Language skills: German (native language), English (Proficient user), French (Independent user), Spanish (Advanced User)  
Work address: Laboratory for Solid State Chemistry and Catalysis  
Empa, 8600 Dübendorf, Switzerland  
Tel.: ++ 41 44 823 46 89  
FAX: ++41 44 823 40 40  
e-mail: [sascha.populoh@empa.ch](mailto:sascha.populoh@empa.ch)  
Private address: Roggenstrasse 6, 8005 Zürich, Switzerland  
Mobile: ++ 41 77 44 25 933

## Education:

- 03.2006 – 06.2009 Ph.D. thesis: Title: '*Investigation of the Mott transition in chromium doped V2O3 by means of ultrasound and thermopower measurements*', Experimental research in solid state physics.  
Experimental technique: RF (radio frequency) measurements and estimation of thermal properties at high temperatures (from room T up to 500 K) using a high pressure system (up to 7000 bar). Participation in the construction of the experimental set-up.  
At Laboratoire de Physique des Solides, Université Paris Sud (Paris XI), 91405 Orsay, France, supervised by Prof. Dr. M. Heritier and Dr. Pawel Wzietek. Financed by a Marie Curie Fellowship awarded by the European Union.  
Grade: tres honorable  
Online accessible under: <http://tel.archives-ouvertes.fr/tel-00406473>
- 10.2004 – 01.2006 Diploma thesis : Title: '*Torque measurements on the semi-metallic ferromagnet EuB6*', Experimental research in solid state physics.  
Experimental technique: Investigation of the magnetic properties in a cryostat down to the temperature of liquid helium. Construction of the experimental set-up including writing the program for the data acquisition.  
At the Institut für Physik der Kondensierten Materie, Technical University of Braunschweig, Braunschweig, Germany, supervised by Prof. Dr. S. Süllo.  
Grade: very good

10.2000 – 01.2006    Technical University of Braunschweig (Germany); study of physics with focus on solid state physics  
06.2000                Final examination: Abitur (A-level education)  
10.1986 – 06.2000    Primary and secondary school in Oelde, Germany

### **Research experience:**

10. 2011 - now        Scientist, Laboratory for Solid State Chemistry and Catalysis, Empa, Dübendorf, Switzerland.  
  
10.2009 – 09. 2011    Postdoc, Laboratory for Solid State Chemistry and Catalysis, Empa, Dübendorf, Switzerland.  
  
03.2006 – 06.2009    At Laboratoire de Physique des Solides, Université Paris Sud (Paris XI), 91405 Orsay, France.

### **Teaching experience:**

2011 – 2013:    **Advanced Composite and Material Systems**, Lecture: Thermoelectricity. ETH Zurich, Switzerland.  
  
2010 – 2013:    Supervisor in student labs for the course “**Experimental Chemistry**” (Master) for students of chemistry at the ETH Zurich, Switzerland.  
  
2010 – 2013:    Supervisor in student labs for the course “**Experimental Chemistry**” (Master) for students of chemistry at the University of Berne, Switzerland.  
  
2004 – 2005:    Supervisor in student labs for the courses “Experimental Physics” (undergraduate) for physicist and assistant of the lecture physics 4: nucleus and molecule physics at the Institut für Physik der Kondensierten Materie, Technical University of Braunschweig, Braunschweig, Germany  
  
2002 – 2005:    Supervisor in student labs for the course “Experimental Physics” (undergraduate) for students of pharmacy, biotechnology and geoecology at the Technical University of Braunschweig, Braunschweig, Germany

### **Memberships:**

1. International thermoelectric society
2. Swiss thermoelectric society (president from 2013 till now)

## Grants / Awards:

1. Honda Initiation Grant Europe 2010 (30 k€), 2010-2011.
2. Marie Curie Fellowship awarded by the European Union for doctoral studies, 2006-2009.

## Organizing:

1. Chair of Symposium C: Advanced thermoelectrics: from materials to devices, EMRS spring meeting 2013 Strasbourg, France.
2. Organizer of the yearly trend-watching meeting “thermoelectric” of the Swiss federal office of energy (SFOE), Switzerland.

## Invited talks / keynote lectures:

1. **Invited contribution:** Half Heusler compounds for thermoelectrics, Autumn School „Thermoelectrics“ 2013 of the German Thermoelectric Society (DTG), Waldeck, Edersee, Germany (October 2013).
2. **Invited contribution:** Waste heat recovery by thermoelectricity, 3rd International Conference Thermal Management for EV/HEV 2013, Darmstadt Germany (June 2013).
3. **Invited contribution:** Correlated transition metal oxides for thermoelectric power generation, XXVIII TROBADES CIENTÍFIQUES DE LA MEDITERRÀNIA, Maó (Menorca) Spain (October 2012).
4. **Invited contribution:** Thermoelectric materials development for heat recovery applications, 2nd International Conference Thermal Management for EV/HEV 2012, Darmstadt Germany (June 2012).
5. **Keynote lecture:** Effect of the structure on the thermoelectric properties of  $\text{Ti}_{0.37}\text{Zr}_{0.37}\text{Hf}_{0.26}\text{NiSn}$  half Heusler compounds, Euromat 2011, Montpellier France (September 2011).
6. **Invited contribution:** Development of nanostructured high temperature thermoelectric materials, XX International Material Research Congress 2011, Cancun Mexico (August 2011).

## 10 oral presentations at international conferences:

1. **Invited contribution:** Half Heusler compounds for thermoelectrics, Autumn School „Thermoelectrics“ 2013 of the German Thermoelectric Society (DTG), Waldeck, Edersee, Germany (October 2013).
2. Half-Heusler compounds for thermoelectricity, Joint Annual Meeting of ÖPG, SPG, ÖGAA und SGAA, Linz, Austria (September 2013).

3. **Invited contribution:** Waste heat recovery by thermoelectricity, 3rd International Conference Thermal Management for EV/HEV 2013, Darmstadt Germany (June 2013).
4. **Invited:** Correlated transition metal oxides for thermoelectric power generation, XXVIII TROBADES CIENTÍFIQUES DE LA MEDITERRÀNIA, Maó (Menorca) Spain (October 2012).
5. **Invited:** Thermoelectric materials development for heat recovery applications, 2nd International Conference Thermal Management for EV/HEV 2012, Darmstadt Germany (June 2012).
6. Correlated transition metal oxides for thermoelectrics, Annual meeting of the swiss physical society, Zurich, Switzerland (June 2012).
7. The power factor of Cr-doped  $V_2O_3$  near the Mott transition, EMRS2012, Strasbourg, France (May 2012).
8. **Keynote lecture:** Effect of the structure on the thermoelectric properties of  $Ti_{0.37}Zr_{0.37}Hf_{0.26}NiSn$  half Heusler compounds, Euromat 2011, Montpellier France (September 2011).
9. **Invited:** Development of nanostructured high temperature thermoelectric materials, XX International Material Research Congress 2011, Cancun Mexico (August 2011).
10.  $V_2O_3$  Mott transition visited by TEP under pressure, GDR thermoélectricité, Nancy, France, (July 2009).

### **Workshops conducted**

Workshop on: Thermoelectric materials development for heat recovery applications, 2nd International Conference Thermal Management for EV/HEV 2012, Darmstadt Germany (June 2012).

### **Reviewer for the following journals:**

1. Elsevier (Journal of Alloys and Compounds, Materials Chemistry and Physics, Journal of the European Ceramic Society )
2. Springer (Journal of Materials Science)
3. American Institute of Physics (Applied Physics Letters)

### **Publication list**

## **Publications in peer reviewed journals:**

1. Tuning the carrier concentration for thermoelectrical application in the quaternary Heusler compound  $\text{Co}_2\text{TiAl}_{(1-x)}\text{Si}_x$  Graf,T.; Barth,J.; Balke,B.; Populoh,S.; Weidenkaff,A.; Felser,C. Scripta Mater., **63**, 925 (2010) Elsevier.
2. Lattice softening effects at the Mott critical point of Cr-doped  $\text{V}_2\text{O}_3$  Populoh,S.; Wzietek,P.; Gohier,R.; Metcalf,P. Phys. Rev. B, **84**, 075158, (2011).
3. Nanostructured Nb substituted  $\text{CaMnO}_3$  n-type thermoelectric Material prepared in a continuous process by Ultrasonic Spray Combustion, Populoh,S.; Trottmann,M.; Aguirre,M.; Weidenkaff,A. J. Mater. Res., **26**, 1947 (2011) MRS; Cambridge University Press.
4. The power factor of Cr-doped  $\text{V}_2\text{O}_3$  near the Mott transition, Populoh,S.; Auban-Senzier,P.; Wzietek,P.; Pasquier,C.R. Appl. Phys. Lett. **99**, 171902 (2011).
5. Influence of the oxygen content on thermoelectric properties of  $\text{Ca}_{3-x}\text{Bi}_x\text{Co}_4\text{O}_{9+\delta}$  system, Moser,D.; Karvonen,L.; Populoh,S.; Trottmann,M.; Weidenkaff,A. Solid State Sciences, **13**, 2160 (2011).
6. Thermoelectric properties of  $\text{CaMnO}_3$  films obtained by soft chemistry synthesis, Alfaruq,D.S.; Otal,E.H.; Aguirre,M.H.; Populoh,S.; Weidenkaff,A. Journal of Materials Research **27**, 985 (2012).
7. High figure of merit in (Ti,Zr,Hf)NiSn half-Heusler alloys, Populoh,S.; Aguirre,M.H.; Brunko,O.C.; Galazka,K.; Lu,Y.; Weidenkaff,A.; Scripta Mater., **66** (12), 1073 (2012).\*
8. Fabrication and characterisation of cellular alumina articles produced via radiation curable dispersions, Wilkens-Heinecke,J.; Hazan,Y.; Populoh,S.; Aneziris,G.C.; Graule,T.; J. Eur. Ceram. Soc. **32**, 2173 (2012).
9. Tracking of high-temperature thermal expansion and transport properties vs. oxidation state of cobalt between +2 and +3 in the  $\text{La}_2\text{Co}_{1+z}(\text{Ti}_{1-x}\text{Mg}_x)_{1-z}\text{O}_6$ -system, S. Shafeie, J. Grins, S. Istomin, A. Andreevich Gippius, L. Karvonen, S. Populoh, A. Weidenkaff, J. Koehler and G. Svensson, J. Mater. Chem., **22**, 16269 (2012).
10. Electronic Structure and Thermoelectric Properties of Nanostructured  $\text{EuTi}_{1-x}\text{Nb}_x\text{O}_{3-\delta}$  ( $x = 0.00; 0.02$ ), L. Sagarna, A. Shkabko, S. Populoh, L. Karvonen, A. Weidenkaff, Appl. Phys. Lett., **101**, 033908 (2012).
11. Thermoelectric properties of nanostructured Al-substituted ZnO thin films, N. Vogel-Schäuble, Y.E. Romanyuk, S. Yoon, K. J. Saji, S. Populoh, S. Pokrant, M.H. Aguirre, A. Weidenkaff, Thin Solid Films, **520**, 6869 (2012).
12. Thermoelectric properties of thin films of Sb-doped  $\text{Mg}_2\text{Si}_{1-x}\text{Sn}_x$  solid solutions, H. Le-Quoc, S. Béchu, S. Populoh, A. Weidenkaff, A. Lacoste, Journal of alloys and Compounds, **546**, 138 (2013).

13. Significant ZT enhancement in p-type Ti(Co,Fe)Sb–InSb nanocomposites via a synergistic high-mobility electron injection, energy-filtering and boundary-scattering approach; W.J. Xie, Y.G. Yana, S. Zhu, M. Zhou, S. Populoh, K. Gałazka, S.J. Poon, A. Weidenkaff, J. He, X.F. Tang, T.M. Tritt, *Acta Mat.* **61**, 2087 (2013).
14. Enhancement of thermoelectric performance in strontium titanate by praseodymium substitution, A.V. Kovalevsky, A.A. Yaremchenko, S. Populoh, A. Weidenkaff, J.R. Frade, *J. Appl. Phys.* **113**, 053704 (2013).
15. Design of p-CuO/n-ZnO heterojunctions by rf magnetron sputtering, K.J. Saji, S. Populoh, A.N. Tiwari, and Y.E. Romanyuk, *Phys. Status Solidi A* **210**, 1386 (2013) - DOI 10.1002/pssa.201228293, in press (2013).
16. Thermal conductivity of thermoelectric Al-substituted ZnO thin films, Nina Vogel-Schäuble, Tino Jaeger, Yaroslav E. Romanyuk, Sascha Populoh, Christian Mix, Gerhard Jakob, Anke Weidenkaff, *Phys. Status Solidi RRL*, **7**, 364 (2013).\*
17. Half-Heusler (TiZrHf)NiSn unileg module with high powder density, Populoh, Sascha; Brunko, Oliver; Galazka, Krzysztof; Xie, Wenjie; Weidenkaff, A., *Materials* **6**, 1326 (2013).
18. Structural and thermoelectric characterization of Ba substituted LaCoO<sub>3</sub> perovskite-type materials obtained by polymerized gel combustion method, R. Kun, S. Populoh, L. Karvonen, J. Gumbert, A. Weidenkaff, M. Busse, *Journal of alloys and Compounds* **579**, 147 (2013).
19. Crystal Growth and Thermoelectric Properties of CaMn<sub>0.98</sub>Nb<sub>0.02</sub>O<sub>3-δ</sub>, D. S. Alfaruq, M. H. Aguirre, E. H. Otal, S. Populoh, L. Karvonen, S. Yoon, Y. Lu, G. Deng, S. G. Ebbinghaus, A. Weidenkaff, *Journal of Crystal Growth*, in press (2013)
20. Structure and thermoelectric properties of EuTi(O,N)<sub>3±δ</sub>, L. Sagarna, K. Z. Rushchanskii, A. Maegli, S. Yoon, S. Populoh, A. Shkabko, S. Pokrant, M. Ležaić, R. Waser, A. Weidenkaff, *J. Appl. Phys.*, **114**, 033701 (2013).\*
21. Phase formation, stability and oxidation in (Ti,Zr,Hf)NiSn half-Heusler compounds, K. Gałazka, S. Populoh, L. Sagarna, L. Karvonen, W. Xie, A. Beni, P. Schmutz, J. Hulliger, A. Weidenkaff, *Phys. Status Solidi A* accepted, in press (2013).\*
22. Construction of a high temperature TEG measurement system for the evaluation of thermoelectric oxide modules, S. Populoh, M. Trottmann, O. C. Brunko, P. Thiel, A. Weidenkaff, *Funct. Mater. Lett.* **06**, 1340012 (2013). DOI: 10.1142/S1793604713400122.\*

Corresponding author in the publications marked by \*

### **Book chapters and proceedings:**

1. Demonstration of high temperature thermoelectric waste heat recovery from exhaust gases in a combustion engine, M. Trottman, A. Weidenkaff, S. Populoh, O. Brunko, A. Veziridis, C. Bach, U. Cabalzar, Thermoelectricity goes automotive, Expert Verlag, pp. 92, 2010, ISBN 978-3-8169-3064-8
2. Thermoelectric oxides and Heusler compounds, A. Weidenkaff, S. Populoh, P. Tomes, A. Shkabko, M. Aguirre, P. Hug, O. Brunko, L. Karvonen, ISRS17 – International Symposium on the Reactivity of Solids Proc. (2011).
3. A morphology study on thermoelectric Al-substituted ZnO, Schäuble, Nina; Süess, Benjamin E.; Populoh, Sascha; Weidenkaff, Anke; Aguirre, Myriam H., 9TH EUROPEAN CONFERENCE ON THERMOELECTRICS: ECT2011. AIP Conference Proceedings, Volume **1449**, 421 (2012).
4. High-temperature thermoelectric properties of W-substituted CaMnO<sub>3</sub>, D.S. Alfaruq, J. Eilertsen, P.Thiel, M.H. Aguirre, E. Otal, S. Populoh, S. Yoon, A. Weidenkaff, Mater. Res. Soc. Symp. Proc **1490** (2013).
5. Attrition-enhanced nanocomposite synthesis of indium-filled, iron-substituted skutterudite antimonides for improved performance thermoelectrics, J. Eilertsen, M. Trottman, S. Populoh, R. Berthelot, C.M. Cooke, M.K. Cinibulk, S. Pokrant, A. Weidenkaff and M.A. Subramanian, Mater. Res. Soc. Symp. Proc **1490** (2013).
6. Thermoelectric properties of Ru and In substituted misfit-layered Ca<sub>3</sub>Co<sub>4</sub>O<sub>9</sub>, Gesine Saucke, Sascha Populoh, Nina Vogel-Schäuble, Leyre Sagarna, Kailash Mogare, Lassi Karvonen and Anke Weidenkaff, Mater. Res. Soc. Symp. Proc **1543** (2013).