Juliano Schorne Pinto, Ph.D.

Materials Science and Engineering | Chemical Thermodynamics | Experimental Physical Chemistry | Molten Salts | Nuclear Fuels

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PROFESSIONAL SUMMARY

Dr. Schorne-Pinto's research interests span a wide range of advanced materials, from ceramics and alloys to nuclear fuels and molten salts, developing thermodynamic databases, and experimental work on radioactive and non-radioactive materials.

EDUCATION

- **PH.D. IN MATERIALS SCIENCE AND ENGINEERING**
  December 2016 – January 2020
  National Polytechnic Institute of Toulouse – Toulouse, France
  - Laboratoire de Génie Chimique (LGC)
  - Centre Interuniversitaire de Recherche et d'Ingénierie des Matériaux (CIRIMAT)

  Thesis title: "*Experimental study and thermodynamic modeling of cuprous delafossites systems*"
  Honors: Léopold Escande prize – top 15% best Ph.D. theses of 2019/2020

- **MASTER OF SCIENCE IN MATERIALS SCIENCE & ENGINEERING**
  August 2014 – July 2016
  Polytech Montpellier – Montpellier, France
  Final project title: "*Thresholds in the Electron Backscatter Diffraction (EBSD) technique for microstructural characterization of silicon carbide-based materials*"
  Honors: Brazil-France Ingénieur Technologie (Brafitec) – scholarship for dual degree in MSE

- **BACHELOR OF SCIENCE IN MATERIALS SCIENCE AND ENGINEERING**
  February 2011 – November 2016
  Federal University of Rio Grande do Sul – Porto Alegre, Brazil

- **TECHNICAL FORMATION IN INFORMATION TECHNOLOGY**
  February 2008 – December 2010
  Universidade Regional Integrada do Alto Uruguai e das Missões (URI) – Santo Ângelo, Brazil

SUMMARY OF TECHNICAL SKILLS

Fabrication: Inorganic chemistry laboratory general use, glovebox, solid-state and sol-gel synthesis

Characterization of bulk materials: Optical and secondary electron microscopy (SEM), energy dispersive spectroscopy (EDS), electron backscatter diffraction (EBSD), X-ray fluorescence (XRF), electron probe microanalysis (EPMA), powder X-ray diffraction (PXRD) high-temperature X-ray diffraction (HT-XRD) coupled with Rietveld refinement, inductively coupled plasma - optical emission spectrometry (ICP-OES), Raman spectroscopy

Experimental physical chemistry: Differential thermal analysis (DTA), thermal gravimetric analysis (TGA), drop calorimetry, and differential scanning calorimetry (DSC)

Thermodynamic modeling: FactSage and ThermoCalc software

RESEARCH AND TEACHING EXPERIENCE

- **RESEARCH ASSISTANT PROFESSOR**
  July 2022 – Present
  Faculty Association: Prof. Dr. Theodore M. Besmann
  University of South Carolina, Department of Mechanical Engineering – Columbia, SC, USA

- **POSTDOCTORAL RESEARCH FELLOW**
  February 2020 – June 2022
  University of South Carolina, Department of Mechanical Engineering – Columbia, SC, USA
  General Atomics SmartState Center for Transformational Nuclear Technologies

- **GRADUATE TEACHING ASSISTANT**
  2017/2018 and 2018/2019
  Université Toulouse III - Paul Sabatier – Toulouse, France
  Faculty of Sciences and Engineering – Department of Chemistry

- **VISITING SCHOLAR AT FACTSAGE™ SOFTWARE DEVELOPMENT CENTER**
  October 2018 – December 2018
  Centre for Research in Computational Thermochemistry, Polytechnique Montreal, Canada

- **ACADEMIC EXCHANGE**
  June 2018 – July 2018
  French research consortium TherMatHT (GDR CNRS 3584) Material Thermodynamics at High Temperatures
  Laboratoire SYMME, Université Savoie Mont Blanc, Annecy, France

- **RESEARCH INTERNSHIP**
  April 2016 – August 2016
  French Alternative Energies and Atomic Energy Commission (CEA) Saclay – Gif-sur-Yvette, France
  Department of Physical Chemistry

- **RESEARCH AND DEVELOPMENT INTERNSHIP**
  May 2015 – August 2015
  Saint Gobain - European Research Center of Cavaillon, France

- **RESEARCH INTERNSHIP**
  October 2011 – June 2014
  Laboratory of Ceramic Materials (LACER), Universidade Federal do Rio Grande do Sul, Porto Alegre, Brazil

AWARDS & HONORS

- **BEST POSTER AWARD**
  May 2023
  50th Calphad, Massachusetts Institute of Technology – Cambridge, MA, USA
  Title: "Challenges in developing predictive thermodynamic models for complex molten salts"

- **LÉOPOLD ESCANDE PRIZE – TOP 15% BEST Ph.D. THESES OF 2019/2020**
  December 2020
  Institut National Polytechnique de Toulouse – Toulouse, France
  Thesis title: "Experimental study and thermodynamic modeling of cuprous delafossites systems"

- **LARRY KAUFMAN TRAVEL AWARD**
  June 2019
  48th Calphad, Singapore

- **AWARD FOR INTERNATIONAL STUDENT MOBILITY – CENTRE FOR RESEARCH IN COMPUTATIONAL THERMOCHIMISTRY / POLYTECHNIQUE MONTRÉAL**
  October 2018 – December 2018
  Institut National Polytechnique de Toulouse – Toulouse, France

- **BRAZIL FRANCE TECHNOLOGY ENGINEERS – SCHOLARSHIP FOR DUAL DEGREE IN MSE**
  June 2014 – July 2016
  Universidade Federal do Rio Grande do Sul (Brazil) and Ecole polytechnique universitaire de Montpellier (France)

LANGUAGES

- ✓ **French:** Fluent
- ✓ **English:** Fluent
- ✓ **Portuguese:** Native Speaker
- ✓ **Spanish:** Conversant

PROFESSIONAL SERVICE & MEMBERSHIP

Member: American Chemical Society; American Nuclear Society and American Ceramic Society
Selected Journals Reviewer: Journal of American Ceramic Society, Calphad, Journal of Nuclear Materials

PUBLICATION SUMMARY

Peer-reviewed papers:	29 (7 as first author/shared first authorship + 22 as co-author)
Total Citations:	262 (as 09/2024)

PEER-REVIEWED PUBLICATIONS

- Published peer-reviewed papers (Underline for shared first-authorship)

2024

1. Masachchi, L. W.; Keerthisinghe, N.; Berseneva, A.; Morrison, G.; Smith, M.; Breton, L.; **Schorne-Pinto, J.**; Aziziha, M.; zur Loye, H.-C. Sensitivity of Mild Hydrothermal Synthesis to the Reaction Conditions: Targeting Mixed-Metal Hexagonal Tungsten Bronze Fluorides $A_xM_{2+x}M_{3+(1-x)}F_3$ to Investigate their Magnetic Behavior. ***Inorg. Chem., 2024**, accepted* (DOI: https://doi.org/10.1021/acs.inorgchem.4c02307).
2. Maltsev, D. S.; Driscoll, D. M.; Zhang, Y.; Neuefeind, J. C.; Reinhart, B.; Agca, C.; Ray, D.; Halstenberg, Aziziha, M.; **Schorne-Pinto, J.**; Besmann, T. M.; Bryantsev, V. S.; Dai, S.; Roy, S.; Ivanov, A. S. Transient Covalency in Molten Uranium (III) Chloride. ***JACS**, **2024**, 600(31), 21220-21224* (DOI: https://doi.org/10.1021/jacs.4c05765).
3. Mofrad, A. M.; Christian, M. S.; **Schorne-Pinto, J.**; Amoroso, J.; Brinkman, K. S.; zur Loye, H.-C.; Besmann, T. M. Predictive Phase Stability of Actinide-Bearing Hollandite Waste Forms from First-Principles Calculations. ***J. Nucl. Mater.**, November **2024**, 600, 155291* (DOI: https://doi.org/10.1016/j.jnucmat.2024.155291).
4. Moon, J.; McFarlane, J.; Andrews, H.; Robb, K.; Sulejmanovic, D.; Zhang, Y.; Stringfellow, E.; Agca, C.; **Schorne-Pinto, J.**; Besmann, T. Density Measurements of Molten LiF-BeF_2 and LiF-BeF_2-LaF_3 Salt Mixtures by Neutron Radiography. ***ACS Omega 2024,** 9(25), 27204-27213* (DOI: https://doi.org/10.1021/acsomega.4c01446)
5. Dixon, C. M.; **Schorne-Pinto, J.**; Aziziha, M.; Yingling, J. A.; Booth, R. E.; Besmann, T. M. Thermodynamic modeling of CsF with LiF-NaF-KF for molten fluoride-fueled reactors. ***J. Mol. Liq., 2024**, 406, 125056* (DOI: https://doi.org/10.1016/j.molliq.2024.125056)
6. **Schorne-Pinto, J.**; Aziziha, M.; Tisdale, H.; Mofrad, A. M.; Birri, A.; Christian, M.; Ard, J.; Booth, R. E.; Yingling, J. A.; Paz Soldan Palma, J.; Dixon, C. M.; zur Loye, H.-C.; Besmann, T. M. Thermal Property Modeling and Assessment of the Physical Properties of FLiNaK. ***ACS Appl. Energy Mater., 2024**, 7(9), 4016-4029* (DOI: https://doi.org/10.1021/acsaem.4c00321).
7. Mofrad, A. M.; Christian, M. S.; **Schorne-Pinto, J.**; Paz Soldan Palma, J.; Besmann, T. M. Effect of XC Functionals and Dispersion Corrections on the DFT-Computed Structural and Vibrational Properties of $SrCl_2$–NaCl and ZrF_4–LiF. ***J. Raman Spectrosc., 2024**, 55(7), 819-832* (DOI: https://doi.org/10.1002/jrs.6670).
8. Besmann, T. M.; **Schorne-Pinto, J.**; Aziziha, M.; Mofrad, A. M.; Booth, R. E.; Yingling, J. A.; Paz Soldan Palma, J.; Dixon, C. M.; Wilson, J. A.; Hartanto, D. Applications of Thermochemical Modeling in Molten Salts Reactors. ***Materials, 2024**, 17(2), 495* (DOI: https://doi.org/10.3390/ma17020495)

2023

9. Karlsson, T.; Middlemas, S. C.; Nguyen, M.-T.; Woods, M. E.; Tolman, K. R.; Glezakou, A.-G.; Herrmann, S. D.; **Schorne-Pinto, J.**; Johnson, R. D.; Reddish, S. E.; Warmann, S. A.; Paviet, P. D. Synthesis and Thermophysical Property Determination of NaCl-$PuCl_3$ Salts. ***J. Mol. Liq., 2023**, 387, 122636* (DOI: https://doi.org/10.1016/j.molliq.2023.122636)
10. Tuffy, B. W.; Birkner, N. R.; **Schorne-Pinto, J.**; Davis, R. C.; Mofrad, A. M.; Dixon, C. M.; Aziziha, M.; Christian, M. S.; Lynch, T. J.; Bartlett, M. T.; Besmann, T. M.; Brinkman, K. S.; Chiu, W. KS. Identification and Decomposition of Uranium Oxychloride Phases in Oxygen-Exposed UCl_3 Salt Compositions. ***J. Phys. Chem. B, 2023,** 127(27), 6091-6101 (*DOI: https://doi.org/10.1021/acs.jpcb.2c09050)
11. Yingling, J. A.; Aziziha, M.; **Schorne-Pinto, J.**; Palma, J. P. S.; Ard, J. C.; Booth, R. E.; Dixon, C. M.; Besmann, T. M. Thermodynamic assessment of $CrCl_2$ with NaCl-KCl-$MgCl_2$-UCl_3-UCl_4 for molten chloride reactor corrosion modeling. ***ACS Appl. Energy Mater., 2023,** 6 (11), 5868-5882* (DOI: https://doi.org/10.1021/acsaem.3c00306)
12. Yingling, J. A.; **Schorne-Pinto, J.**; Aziziha, M.; Ard, J. C.; Mofrad, A. M.; Christian, M. S.; Dixon, C. M.; Besmann, T. M. Thermodynamic measurements and assessments for LiCl-NaCl-KCl-UCl_3 systems. ***J. Chem. Thermodyn., 2023**, 179, 106974* (DOI: https://doi.org/10.1016/j.jct.2022.106974)
13. Ard, J. C.; **Schorne-Pinto, J.**; Aziziha, M.; Yingling, J. A.; Mofrad, A. M.; Johnson, K. E.; Dixon, C. M.; Besmann, T. M. Thermodynamic assessments or reassessments of 30 pseudo-binary and-ternary salt systems. ***J. Chem. Thermodyn., 2023**, 177, 106931* (DOI: https://doi.org/10.1016/j.jct.2022.106931)

2022

14. Berseneva, A. A.; Aziziha, M.; **Schorne-Pinto, J.**; Besmann, T. M.; zur Loye, H-C. All-Inorganic Open-Framework Chalcogenides, $A_3Ga_5S_{9-x}H_2O$ (A = Rb and Cs), Exhibiting Ultrafast Uranyl Remediation and Illustrating a Novel Post-Synthetic Preparation of Open-Framework Oxychalcogenides. ***Chem. Mater., 2022**, 34(18), 8366-8378* (DOI: https://doi.org/10.1021/acs.chemmater.2c02059)
15. Aziziha, M.; **Schorne-Pinto, J.**; Yingling, J. A.; Dixon, C. M.; Ard, J. C; Aslani, M. A. A.; Mofrad, A. M.; Besmann, T. M. Thermodynamic Assessment of Lithium Halide Reciprocal Salt Systems for Energy Applications. ***J. Mol. Liq., 2022**, 364, 119973* (DOI: https://doi.org/10.1016/j.molliq.2022.119973)
16. Carone, D.; Klepov, V. V.; Misture, S. T.; Schaeperkoetter, J. C.; Jacobsohn, L. G.; Aziziha, M.; **Schorne-Pinto, J.**; Thomson, S. A. J.; Hines, A. T.; Besmann, T. M.; zur Loye, H-C. Luminescence and Scintillation in the Niobium Doped Oxyfluoride $Rb_4Ge_5O_9F_6$:Nb. ***Inorganics, 2022,** 10 (6), 83* (DOI: https://doi.org/10.3390/inorganics10060083)
17. Christian, M. S.; Lynch, T. J.; **Schorne-Pinto, J.**; Mofrad, A. M.; Birkner, N. R.; Brinkman, K. S.; Chiu, W. K. S.; Besmann, T. M. Modeling Metallic Halide Local Structures in Salt Melts Using a Genetic Algorithm. ***J. Phys. Chem. C 2022**, 126(22), 9239–9247* (DOI: https://doi.org/10.1021/acs.jpcc.2c00747)
18. Ard, J. C.; Yingling, J. A.; Johnson, K. E.; **Schorne-Pinto, J.**; Aziziha, M.; Dixon, C. M.; Christian, M. S.; McMurray, J. W.; Besmann, T. M. Development of the *Molten Salt Thermal Properties Database− Thermochemical (MSTDB− TC)*, example applications, and LiCl–RbCl and UF_3–UF_4 system assessments. ***J. Nucl. Mater., 2022**, 563, 153631* (DOI: https://doi.org/10.1016/j.jnucmat.2022.153631)
19. Lynch, T. J.; Birkner, N. R.; Christian, M. S.; Wrubel, J. A.; **Schorne-Pinto, J.**; Hoffman, A. S.; Van Veelen, A.; Bargar, J. R.; Bare, S. R.; Besmann, T. M.; Brinkman, K. S.; Chiu, W. K. S. *In Situ* Determination of Speciation and Local Structure of NaCl–$SrCl_2$ and LiF–ZrF_4 Molten Salts. ***J. Phys. Chem. B, 2022**, 126 (7), 1539-1550* (DOI: https://doi.org/10.1021/acs.jpcb.1c07552)
20. **Schorne-Pinto, J.**; Yingling, J. A.; Christian, M. S.; Mofrad, A. M.; Aslani, M. A. A.; Besmann, T. M. Correlational approach to predict enthalpy of mixing in Alkali-Actinide Chloride melt systems. ***ACS Omega 2022,** 7(1), 362–371* (DOI: https://doi.org/10.1021/acsomega.1c04755)

2021

21. Besmann, T. M.; **Schorne-Pinto, J.** Developing Practical Models of Complex Salts for Molten Salt Reactors. ***Thermo, 2021,** 1 (2), 168-178* (DOI: https://doi.org/10.3390/thermo1020012)
22. **Schorne-Pinto, J.**; Chartrand, P.; Barnabé, A.; Cassayre, L. Thermodynamic and Structural Properties of $CuCrO_2$ and $CuCr_2O_4$: Experimental Investigation and Phase Equilibria Modeling of the Cu–Cr–O System. ***J. Phys. Chem. C, 2021,** 125 (27), 15069-15084* (DOI: https://doi.org/10.1021/acs.jpcc.1c04179)

2020

23. Hodel, F.; Macouin, M.; Trindade, R. I. F.; Araujo, J. F. D. F.; Respaud, M.; Meunier, J. F.; Cassayre, L.; Rousse, S.; Drigo, L.; **Schorne-Pinto, J.** Magnetic Properties of Ferritchromite and Cr-Magnetite and Monitoring of Cr-Spinels Alteration in Ultramafic and Mafic Rocks. ***Geochem Geophys 2020**, 21 (11), 1–21* (DOI: https://doi.org/10.1029/2020GC009227)
24. Sinnarasa, I.; Thimont, Y.; Barnabé, A.; Beaudhuin, M.; Moll, A.; **Schorne-Pinto, J.**; Tailhades, P.; Presmanes, L. Microstructural and transport properties of Mg doped $CuFeO_2$ thin films: A promising material for high accuracy miniaturized temperature sensors based on the Seebeck effect. ***J. Alloys Compd. 2020**, 827, 154199* (DOI: https://doi.org/10.1016/j.jallcom.2020.154199)

2019

25. **Schorne-Pinto, J.**; Janghorban, A.; Lomello-Tafin, M.; Pisch, A.; Mikaelian, G.; Benigni, P.; Barnabé, A.; Cassayre, L. Assessment of Thermodynamic Data for $CuCrO_2$ Delafossite from Calorimetric Measurements. ***Thermochim. Acta 2019**, 680 (July), 178345* (DOI: https://doi.org/10.1016/j.tca.2019.178345)
26. **Schorne-Pinto, J.**; Cassayre, L.; Presmanes, L.; Barnabé, A. Insights on the Stability and Cationic Nonstoichiometry of $CuFeO_2$ Delafossite. ***Inorg. Chem. 2019**, 58 (9), 6431–6444* (DOI: https://doi.org/10.1021/acs.inorgchem.9b00651)
27. Soldi, L.; Gossé, S.; Laplace, A.; Bonnaillie, P.; **Schorne-Pinto, J.**; Roskosz, M. Experimental Study and Thermodynamic Modelling of the Cu-Fe-Si-U Sub-Systems. ***J. Alloys Compd. 2019,** 799, 239–246* (DOI: https://doi.org/10.1016/j.jallcom.2019.05.294)

2014-2017

28. Zampiva, R. Y. S.; Kaufmann Junior, C. G.; Pinto, J. S.; Panta, P. C.; Alves, A. K.; Bergmann, C. P. 3D CNT Macrostructure Synthesis Catalyzed by $MgFe_2O_4$ Nanoparticles—A Study of Surface Area and Spinel Inversion Influence. ***Appl. Surf. Sci. 2017**, 422, 321–330* (DOI: https://doi.org/10.1016/j.apsusc.2017.06.020)
29. Da Dalt, S.; Schorne Pinto, J.; Sanchez, F. A. L.; Alves, A. K.; Pérez Bergmann, C. Energy Gap Associated to Photocatalytic Activity of MWCNT/TiO2/ZnO Nanocomposites. Adv. Sci. Technol. 2014, 95, 44–49 (DOI: https://doi.org/10.4028/www.scientific.net/AST.95.44)

- Technical report:
  - Ard, J.; Johnson, K.; Christian, M.; **Schorne Pinto, J.**; Yingling, J.; Besmann, T. M.; Mcmurray, J. W.; Peng, J. FY20 Status report on the Molten Salt Thermodynamic Database (MSTDB) development. ***ORNL/SPR-2020/1648, 2020.***

- Book chapter:
  - Kaufmann, C. G.; **Schorne-Pinto, J**. CNT Sponges for Environmental Applications. In *Nanomaterials for Eco-friendly Applications*; Kopp Alves, A., Ed.; *Springer International Publishing, **2019**; 1–13*.

- Conference proceeding:
  - Mofrad, A. M.; **Schorne-Pinto, J.**; Christian, M. S.; Besmann, T. M. Structural Prediction of Actinide-Bearing Hollandites for Nuclear Waste Forms. *American Nuclear Society Transactions, 2021, 124, 142-145*
  - Besmann, T. M.; Yingling, J. A.; Ard, J. C.; **Schorne-Pinto, J.**; Aziziha, M. Christian, M. S.; Mofrad, A. M.; Johnson, K. E.; Agca, C.; McMurray, J. W.; Gakhar, R. Corrosion System-Focused Expansion and Application of the Thermochemical Database for Molten Salt Reactors: MSTDB-TC. *American Nuclear Society Transactions, 2021, 124, 69-70*
  - Guaglianoni, W. C.; Garcia, A. P.; O, B. J.; **Pinto, J. S.**; Basegio, T. M.; Bergmann, C. P. Photocatalytic Activity of Zinc Oxide Nanostructured Synthesized by Combustion in Solution. *In **69° Congresso annual da Associação Brasileira de Metalurgia, Materiais e Mineração**; São Paulo, **2014***
  - Da Dalt, S.; **Pinto, J. S.**; Alves, A. K.; Pérez Bergmann, C.; Nunes, S. K. Energia de Gap Associada à Atividade Fotocatalitica Do Nanocomposito TiO_2-NTCPM. *In **58 Anais do Congresso Brasileiro de Ceramica;** Bento Gonçalves, **2014**; pp 1-10 (in Portuguese)*
  - Garcia, A. P.; Guaglianoni, W. C.; Barnasque, J. O.; **Pinto, J. S.**; Bergmann, C. P. Síntese de óxido de zinco nanoestruturado através do método de combustão em solução e sua caracterização microestrutural. In *20° CBECIMAT – Congr. Bras. Eng. E Ciência dos Mater. 2012, 1599-1606* (in Portuguese)
  - Da Dalt, S.; **Pinto, J. S.**; Alves, A. K.; Bergmann, C. P. Photocatalytic Properties of MWCNT Coated with TiO_2, SnO_2 and ZnO. In *AES-ATEMA International Conference Series – **Advances and Trends in Engineering Materials and their Applications;** Montréal, **2012**; 175–179*
  - Da Dalt, S.; **Pinto, J. S.**; Alves, A. K.; Bergmann, C. P. Photocatalytic Degradation of the Synthetic Dye in the Presence of the MWCNT-ZnO Composite. *In **XI Encontro da SBPMat**, Florianópolis, **2012***
