SIMON SCHORN, PH.D.

CURRICULUM VITAE

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Professional profile

Computational petrologist with over 10 years of experience in analytical characterisation, petrological interpretation, and physics-based modelling of high-temperature multiphase systems. As an R&D Associate in Mineralogy at RHI Magnesita, I develop thermodynamic and numerical models to investigate refractory corrosion and performance. I combine experimental and microstructural observations with modelling to quantify phase stability, reaction kinetics, combustion energy budgets, and coupled heat and mass transfer. I develop scientific workflows from problem formulation through validation and communicate results to interdisciplinary teams. Proven track record in external research funding acquisition, project leadership, and international collaboration.

Current focus: Predictive modelling of refractory degradation under industrial operating conditions. I use phase equilibria, reaction kinetics, and transport models to assess how slag chemistry, gas composition, and temperature affect reaction products, infiltration, and corrosion. The aim is to support refractory material development and process optimization.

Core competencies

- **Analytical & petrological expertise:** mineralogical and textural characterisation as quantitative input for modelling; interpretation of reaction mechanisms for model calibration and validation.
- **Thermochemical modelling:** multicomponent equilibrium calculations; reaction paths and phase stability, chemical potentials, heat effects, and buffering concepts to assess system sensitivity & stability.
- **Coupled process modelling:** interaction of heat transfer, reaction kinetics, diffusion, and mechanics; identification of rate- and performance-limiting processes (e.g. reaction fronts, material weakening).
- **Scientific leadership & teamwork:** independent project ownership; mentoring; close collaboration in local and international research networks.
- **Funding & project management:** PI-level responsibility for proposal conception, budgeting, execution, reporting, and dissemination.

Technical skills

- **Analytical methods:** optical microscopy (transmitted/reflected light); SEM (BSE, EBSD); EMPA for quantitative major- and trace-element chemistry (EDX, WDX); compositional mapping; mineral formula calculation; XRF analysis.
- **Thermodynamic modelling:** phase equilibria calculations using reaction-based solvers (THERMOCALC) and Gibbs-energy minimisation (FactSage, Perple_X & MAGEMin); customised data processing, visualisation, and quantitative comparison with analytical observations.
- **Numerical modelling:** MATLAB, Python, Julia; finite-difference and finite-element methods; explicit/ implicit and transient solvers; non-dimensionalisation. Applications include thermal and chemical diffusion, latent heat effects, thermomechanical coupling, and hydro-chemomechanical processes.
- **Data & visualisation:** reproducible workflows; model validation and sensitivity analysis; clear, publication-quality graphical communication.

Professional experience

Jun 2026–present	**R&D Associate in Mineralogy, RHI Magnesita Technology Center, Leoben, Austria** Develop and apply thermodynamic and numerical models to investigate refractory corrosion and performance at high temperatures; guide the development and optimization of materials and processes. *Focus areas*: solid–liquid–gas interactions, reaction kinetics, and heat and mass transfer in refractory systems.
Apr 2024–Apr 2026	**Alexander-von-Humboldt Fellow, Institute of Geosciences, Universität Mainz, Germany** Independent project integrating analytical and experimental petrology, thermodynamic modelling, and numerical simulations to quantify coupled thermal–chemical processes in multiphase systems. *Key outputs:* predictive thermodynamics; reaction energetics; workflows for forward prediction of material behaviour; interdisciplinary communication.
Oct 2020–Mar 2024	**Postdoctoral Research Fellow, NAWI Geocenter, Universität Graz, Austria** Principal Investigator of a research project (FWF; € 241,416.84), with full scientific, financial, and administrative responsibility. *Key outputs:* project conception and acquisition; petrological investigation and analytical characterisation; thermodynamic and numerical thermal modelling; budget management; reporting; publication and presentation of results.
Oct 2019–Oct 2020	**Postdoctoral Research Fellow, University of Melbourne, Australia** Critical evaluation of limitations in existing equation-of-state models and development of improved composition-dependent formulations for solid solutions. *Key outputs:* refined conceptual models and parameterisation strategies.

Education

2016–2019	**Ph.D. Earth Sciences, University of Cape Town, South Africa** High-temperature metamorphism; quantitative phase equilibria, reaction energetics, and thermal processes.
2012–2015	**M.Sc. Earth Sciences, Universität Graz, Austria** (Graduated with distinction)
2009–2012	**B.Sc. Earth Sciences, Università di Padova, Italy** (110/110 cum laude)

Selected awards & recognition

2024	**Otto-Ampferer Award** | Austrian Geological Society; outstanding scientific contributions.
2023	**Felix-Machatschki Prize** | Austrian Mineralogical Society; excellence in mineralogical research.
2022	**W.E. Petrascheck Award** | Austrian Academy of Sciences; outstanding early-career scientific achievement.

Communication, dissemination & mentoring

- Scientific communication in German, English, and Italian.
- Author and reviewer of peer-reviewed publications in international journals.
- Regular oral and poster presentations at international conferences and invited seminars.
- Supervision and mentoring of students; strong team player in local and international collaborations.

Software / code

- **ZirTiDiS** (2024): implicit finite-difference tool for diffusion and thermometry calculations (DOI 10.5281/zenodo.11184086).
- **T1dH** (2024): 1-D heat conduction code using the enthalpy method (DOI 10.5281/zenodo.11046565).

References

Available upon request. (Academic referees can be provided immediately.)