

THEODORE HANEIN

Personal:

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PERSONAL STATEMENT

I am a chemist/chemical process engineer who applies a wide range of computational and laboratory techniques to solve engineering problems. My main research focus is on reducing the carbon footprint and energy consumption of cement manufacture. I am currently working as a research associate (post-doc) in the department of Material Science & Engineering at the University of Sheffield. Thus far, I have secured three post-doctoral research contracts. Although settled in my current role, I believe I am ready for the next stage of my career and am seeking a permanent position with greater challenges that will also allow me to develop my own research ideas.

EDUCATION

- 2012–2016 **University of Aberdeen** Aberdeen, UK
PhD in Chemical Engineering, School of Engineering,
Supervisors: Dr. Marcus N. Bannerman and Prof. Frederik P. Glasser
Thesis: *Development of a novel Calcium SulfoAluminate cement production process.*
- 2011–2012 **University of Manchester** Manchester, UK
MSc in Refinery Design and Operation (Advanced Process Design)
Dissertation: *Heat exchanger network design for improved heat recovery.*
- 2005–2011 **University of Balamand** Balamand Al Kurah, Lebanon
BSc in Chemical Engineering - 81%
Project: *Catalytic oxidation of Carbon Black.*
- 2005–2010 **University of Balamand** Balamand Al Kurah, Lebanon
BSc in Chemistry - 75%
Project: *Analysing the efficiency of waste-water treatment plants.*

WORK EXPERIENCE

- 2016–Present **University of Sheffield** Sheffield, UK
Research Associate in Materials Chemistry (Post-doc)
Department of Materials Science and Engineering
Supervisors: Dr. Hajime Kinoshita and Prof. John L. Provis
Research topics:
1) *Using molten salts in cement manufacture*
2) *Developing novel alkaline water technology*
- 2015–2016 **IBU-tec and University of Aberdeen** Weimar, Germany & Aberdeen, UK
Process design, optimisation, and management for the successful mass production of novel low-carbon cement clinkers.
- 2012–2016 **University of Aberdeen** Aberdeen, UK
Tutor and laboratory demonstrator
School of Engineering
Courses included: Thermodynamics, Heat & Mass transfer, and Separation Processes.
- 2011 **Cimenterie Nationale** Chekka, Lebanon
Process Engineering Trainee
Areas of training: plant safety, quality control, and kiln systems.

GRANTS AND AWARDS

- 2017 R-CoI on a standard research proposal submitted to EPSRC (Ref:153737; submitted on the 24th of August 2017)
Engineering Research Society DO Fund, University of Sheffield. (£250)
- 2016 Principal's Excellence Fund, University of Aberdeen. (£500)
- 2013–2014 Sarah and John Webber Scholarship, 2 years, University of Aberdeen. (£10,000)

ADMINISTRATION/RESEARCH ROLES

- 2017–present Associate member of the Royal Society of Chemistry.
- 2016–present Reviewer for the journal “Materials and Structures”.
- 2016–present Coordination of meetings and production of final reports for various research projects.
- 2015–2017 Design and supervision of 6 undergraduate projects and 2 masters project.
- 2015–2016 Member of the organizing committee of both the 35th and 36th Cement and Concrete Science Conference.
- 2015 Organizer of the 6th Engineering Postgraduate Research Symposium (University of Aberdeen).

ADDITIONAL COURSES

- 2017 Personal Pathway to Professional Recognition (working towards an HEA fellowship).
University of Sheffield, UK
- 2016 FQM presentation skills training course. FQM Ltd, UK
- 2013 Leadership. University of Aberdeen, UK
- 2013 Marie Curie training course on the innovation of cementitious materials. Nanocem, Lyon, France

INDUSTRIAL CONTACTS

Contact	Industry	Year	Relationship
James Adams	Embr control and automation Ltd.	2017	Project partner
Michael Adams	WET Engineering Ltd.	2016–2017	Project partner
Nestor Quintero Mora	CEMEX	2016–2017	Project partner
Magnus Nyberg	CEMEX	2016–2017	Project partner
Ed Cavanagh	Hope Cement Works	2016	Researcher development
Thomas Matschei	LafargeHolcim	2015–2016	Project partner
Vadym Kuznietsov	IBU-tec	2015–2016	Research project

LIST OF JOURNAL PUBLICATIONS

- 2017 **Hanein, T.**, Galan, I., Glasser, FP., Skalamprinos, S., Elhoweris, A., Imbabi MS., and Bannerman, MN. “Stability of ternesite and the production at scale of ternesite-based clinkers”, *Cement and Concrete Research* **98C**, 91–100.
- Hanein, T.**, Glasser, FP., and Bannerman, MN. “1D thermal model of rotary kilns used in cement production”, *Advances in Applied Ceramics* **116:4**, 207–215.

Galan, I., **Hanein, T.**, Elhoweris, A., Bannerman, MN., and Glasser, FP. “Phase compatibility in the system $\text{CaO-SiO}_2\text{-Al}_2\text{O}_3\text{-SO}_3\text{-Fe}_2\text{O}_3$ and the effect of partial pressure on phase stability”, *Industrial & Engineering Chemistry Research* **56:9**, 2341–2349.

Galan, I., Elhoweris, A., **Hanein, T.**, Bannerman, MN., and Glasser, FP. “Advances in clinkering technology of calcium sulfoaluminate cement”, *Advances in Cement Research* **29:10**, 405–417.

Khare, S., Bannerman, MN., Glasser, FP., **Hanein, T.**, and Imbabi MS. “Pilot scale production of novel calcium sulfoaluminate cement clinkers and development of thermal model”, *Chemical Engineering and Processing: Process Intensification* **122**, 68–75.

Skalamprinos, S., Galan, I., **Hanein, T.**, and Glasser, FP. “Enthalpy of formation of ye'elimite and ternesite”, *Journal of Thermal Analysis and Calorimetry*. <https://doi.org/10.1007/s10973-017-6751-0>

Hanein, T., Galvez-Martos, JL., and Bannerman, MN. “Carbon footprint of calcium sulfoaluminate clinker production”, *Journal of Cleaner Production* (**under review**).

2016 **Hanein, T.**, Galan, I., Elhoweris, A., Khare, S., Skalamprinos, S., Jen, G., Whittaker, M., Imbabi MS., Glasser, FP., and Bannerman, MN. “Production of Belite Calcium SulfoAluminate cement using sulfur as a fuel and as a source of clinker sulfur trioxide: Pilot kiln trial”, *Advances in Cement Research* **28:10**, 643–653.

2014 El Hassan, N., Casale, S., Aouad, S., **Hanein, T.**, Jabbour, K., Chidiac, E., el Khoury B., El Zakhem H., and El Nakat, H. “Activity of Highly Dispersed Co/SBA-15 Catalysts (Low Content) in Carbon Black Oxidation” *Physics Procedia* **55**, 231–236.

LIST OF CONFERENCE PROCEEDINGS

2017 **Hanein, T.**, Provis, J., Nyberg, M., Quintero Mora, NI., Tyrer, M., Maries, A., and Kinoshita, H. “Molten salt synthesis of compounds related to cement”. *In proceedings: 1st International Conference on Cement and Concrete Technology, Muscat, Oman.*

Hanein, T., Galan, I., Skalamprinos, S., Elhoweris, A., Glasser, FP., and Bannerman, MN. “Optimising calcium sulfoaluminate cements”. *In proceedings: 37th Cement and Concrete Science Conference, London, UK.*

Hanein, T., Provis, J., Nyberg, M., Quintero Mora, NI., Tyrer, M., Maries, A., and Kinoshita, H. “Prospects for manufacturing cement compounds in molten salt fluxed systems”. *In proceedings: 37th Cement and Concrete Science Conference, London, UK.*

Bannerman, MN., **Hanein, T.**, and Glasser, FP. “Validation of a one-dimensional kiln heat transfer model against a pilot kiln”. *In proceedings: 37th Cement and Concrete Science Conference, London, UK.*

2016 **Hanein, T.**, Imbabi MS., Glasser, FP., and Bannerman, MN. “Lowering the carbon footprint and energy consumption of cement production: A novel Calcium SulfoAluminate cement production process”. *In proceedings: 1st International Conference on Grand Challenges in Construction Materials, Los Angeles, California, USA.*

2015 **Hanein, T.**, Glasser, FP., and Bannerman, MN. “Thermodynamics of Portland Cement Clinkering”. *In proceedings: 14th International Congress on the Chemistry of Cement, Beijing, China.*

Hanein, T. and Bannerman, MN. “1D thermal model of rotary kilns used in cement production”. *In proceedings: 35th Cement and Concrete Science Conference, Aberdeen, UK.*

Hanein, T., Galan, I., Elhoweris, A., Glasser, FP., and Bannerman, MN. “Thermodynamic data of ye’elemite (C_4A_3S) for cement clinker equilibrium calculations”. *In proceedings: 35th Cement and Concrete Science Conference, Aberdeen, UK.*

ORAL PRESENTATIONS

- 2017 Prospects for manufacturing cement compounds in molten salt fluxed systems, 37th Cement and Concrete Science Conference, London, UK.
 Optimising calcium sulfoaluminate cements, 37th Cement and Concrete Science Conference, London, UK.
- 2016 Lowering the Carbon footprint and energy consumption of cement production, University of California, 1st International Conference on Grand Challenges in Construction Materials, Los Angeles, USA.
- 2015 1D thermal model of rotary kilns used in cement production, 35th Cement and Concrete Science Conference, Aberdeen, UK.
 Thermodynamic data of ye’elemite (C_4A_3S) for cement clinker equilibrium calculations, 35th Cement and Concrete Science Conference, Aberdeen, UK.
 High temperature thermodynamic prediction of cement phases, 6th Engineering Postgraduate Research Symposium, Aberdeen, UK.

POSTER PRESENTATIONS

- 2015 Hanein T. and Bannerman MN., “Thermodynamics of Portland Cement Clinkering”, 14th International Congress on the Chemistry of Cement, Beijing, China.
- 2014 Hanein T. and Bannerman MN., “Heat transfer in rotary kilns used in cement production”, 5th Engineering Postgraduate Research Symposium, Aberdeen, UK.

SKILLS

Programming: Highly proficient in Python.

Laboratory: High-temperature synthesis in muffle and atmospheric furnaces, X-ray diffraction (XRD), differential scanning calorimetry (DSC), scanning electron microscopy with energy-dispersive X-ray spectroscopy (SEM-EDX), pycnometry, surface area analysis (BET), X-ray fluorescence (XRF), laser diffraction for particle size analysis, and thermogravimetric analysis (TGA). Operator of Gunt-Hamburg, CE600 (Continuous distillation), and CE400 (Gas absorption) rigs.

Simulation: Analytical and numerical modeling including: Computational thermodynamics and one-dimensional heat transfer in rotary kilns

Software: Publishing: \LaTeX , Beamer, MS/Open Office.
 Data analysis: GSAS (General Structure Analysis System) for Rietveld refinement.
 Graphing/Math: Python.

Languages: Fluent in English and basic communication skills in Levantine Arabic.