

Publications List: Dr. Mark Tyrer

1) Peer reviewed Journal and Serial publications

X.C. Qiao, M. Tyrer, B.R. Ng, , C.S. Poon and C.R. Cheeseman (2008) "Novel Cementitious Materials produced from Incinerator Bottom Ash" Resources, Conservation and Recycling 52(3) pp 496-510 *Accepted for publication. In Press*

X.C. Qiao, M. Tyrer, C.S. Poon and C.R. Cheeseman (2008) "Characterisation of alkali-activated, thermally treated incinerator bottom ash" Waste Management Waste Manag, 2007, ISSN: 0956-053X *Accepted for publication. In Press*

Simon D.M. Jacques, Alejandra Gonzalez-Saborido, Olivier Leynaud, John Bensted, Mark Tyrer, Rosemary I.W. Greaves and Paul Barnes. (2007) "Structural Evolution during the dehydration of gypsum minerals" Submitted to: Journal of Materials Chemistry. October 2007 *In Review.*

Tyrer., M ; Kalumba., ; D., Rogers., C.D.F. ; Glendinning., S. ; Atkinson., A. ; Gibbon., A. (2007) "Dewatering of Mineral Fines" Submitted to: Waste and Resource Management, December 2007 *In Review*

Colin S. Walker, David Savage, Mark Tyrer and K. Vala Ragnarsdottir (2007) "Modelling the degradation of hydrated Ordinary Portland Cement: I. Simulating laboratory data using PHREEQC" Submitted to: Journal of the American Ceramic Society. August 2007 *In Review*

Q.Y. Chen, C.D. Hills, M. Tyrer, I. Slipper, H.G. Shen, A. Brough (2007) "Characterisation of products of tricalcium silicate hydration in the presence of heavy metals" Journal of Hazardous Materials, Volume 147, Issue 3, 25 August 2007, Pages 817-825

Quanyuan Chen , Colin D Hills , Menghong Yuan , Huanhuan Liu , Mark Tyrer (2007) "Characterization of carbonated tricalcium silicate and its sorption capacity for heavy metals: A micron-scale composite adsorbent of active silicate gel and calcite". Submitted to: Journal of Hazardous Materials. *In Review*

Colin S. Walker, David Savage, Mark Tyrer and K. Vala Ragnarsdottir (2007) 'Non Ideal Solid-Solution Aqueous-Solution of Synthetic Calcium Silicate Hydrate'. Cement and Concrete Research 37 (2007) Pages 502–511

X.C. Qiao, B.R. Ng, M. Tyrer, C.S. Poon and C.R. Cheeseman (2007) "Production of lightweight concrete using incinerator bottom ash" Submitted to Construction and Building Materials *Accepted for publication. In Press*

S. Donatello, M. Tyrer & C.R.Cheeseman (2006) "Recent Developments in Macro Defect Free (MDF) Cements" Submitted to Advanced Cement Based Materials" October 2006 *In Review*

Chen Q, Hills C.D , Tyrer M. , Slipper I, Brough A (2006) "The Carbonation of C₃S in the Presence of Heavy Metals: Derivation of a Structural Model for Silicate Products" Submitted to Cement and Concrete Research. January 2007 *In Review*

Kalumba, D., Glendinning, S., Rogers, C. D. F., and Boardman, D. I. Tyrer., M (2006) "Dewatering of Tunnelling Slurry Waste using Electrokinetic Geosynthetics" Submitted to Tunnels and Tunnelling January 2007 *In Review*

M.Tyrer, A.Atkinson E.Ganjian & P.A. Claisse (2007) 'Autogenous crack healing in barriers to pollution migration' Submitted to ASCE Environment Journal *In Review*

E. Ganjian, P. Claisse, M. Tyrer and A. Atkinson (2006) Factors affecting measurement of hydraulic conductivity in low strength cementitious materials. *Cement and Concrete Research* v36 pp 2109-2114

Quanyuan Chen, C. D. Hills, M. Tyrer and I. Slipper (2005) "The hydration and carbonation of tricalcium aluminate (C3A) in the presence of heavy metals" *China's Refractories* Volume 14, No.3 page 27-32

P Claisse, E Ganjian, A Atkinson and M Tyrer (2006) 'Measuring And Predicting Transport in Composite Cementitious Barriers' *ACI Materials Journal* Volume 103 (2) pp 113-120

M. Cardonnel, K. Canning, P. J. Carey, C. D. Hills, C. L. MacLeod, M. Tyrer & O. Rodriguez (2006) 'Cement stabilisation of an arsenic contaminated soil using Accelerated Carbonation Technology'. Submitted 'Science of the Total Environment' *In revision*

E. Ganjian, P.A. Claisse, M. Tyrer and A. Atkinson, (2004) 'Selection of cementitious mixes as a barrier for landfill leachate containment'. *ASCE Journal of Materials in Civil Engineering*, v16 (5) October 2004. pp. 477-486 ISSN 0899-1561

E. Ganjian, P. Claisse, M. Tyrer and A. Atkinson, (2004) 'Preliminary investigations into the use of secondary waste minerals as a novel cementitious landfill liner', *Construction & Building Materials Journal*, v18; (9); 2004 pp. 689-699 ISSN 0950-0618

Sneyers, A.; Paul, M.; Tyrer, M.; Glasser, F.P.; Fays, J.; Van Iseghem, P. (2002) In-Situ Interaction between Cement and Clay: Implications for Geological Disposal. *Materials Research Society Symposium Proceedings*, 663 (Scientific Basis for Nuclear Waste Management XXIV), 123. (Symposium held 27-31 August, 2000, Sidney, Australia)

Duerden, S., Glasser, F.P., Goldthorpe, K., Pedersen, J., Quillin, K., Ross, D., Stronach, S.A. and Tyrer, M. (1997). Chemistry and performance of blended cements and backfills for use in radioactive waste disposal. *Material Research Society Symposium Proceedings*, Vol.465, pp. 287-294.

F.P. Glasser, K Goldthorpe, J. Pedersen, K Quillin, D. Ross, S.A. Stronach and M. Tyrer. (1997) 'The Chemistry and Performance of Cements and Backfills for use in radioactive waste disposal' *Scientific Basis for Nuclear Waste Management XX*. (Ed., W. J. Gray and I. R. Triay). *Mater. Res. Soc. Proc.* Pittsburg PA) 465, 287-294.

Tyrer., M. and Ross D.J. (1995) 'Simulation of cement-groundwater interactions; Application of equilibrium thermodynamics to highly saline systems'. *Bull. Mat Res. Soc. Scientific Basis for Nuclear Waste Management Vol19 R6.14/V22.14*

2) Books

B.D. Bone, L.H. Barnard, D.I. Boardman, P.J. Carey, C.D. Hills, H.M. Jones, C.L. MacLeod and M. Tyrer (2004) '**CASSST** Review of scientific literature on the use of stabilisation/solidification for the treatment of contaminated soil, solid waste and sludges'. Chapter 10; Modelling techniques and their application to s/s waste forms. *Environment Agency (Publ.) Bristol, UK. ISBN: 1 844 323 196*

3) Conference Proceedings

Colin S. Walker, David Savage, Mark Tyrer & K. Vala Ragnarsdottir "Modelling the degradation of ordinary Portland cement using PHREEQC" *Proc. 27th Cement and Concrete Science Conference*, Royal Holloway College, University of London. 17th – 18th September 2007 pp78-82. Eds. C.H.Fentiman & R.J.Manganhai. ISBN-13: 987-0-9553296-2-3

Sandra Gonzalez Saborido, Mark Tyrer, Simon Jacques, Paul Barnes. "An in situ Synchrotron Diffraction-Tomography Study of Cementitious Barrier Systems" (12th International Congress on the Chemistry of Cement, Montreal, 2007. Proceedings in press)

J.A. Gisby, R.H. Davies, A.T. Dinsdale, M. Tyrer, F.P. Glasser, J. Hill, P. Livesey, C.S Walker "C-S-H Solubility Modelling at High Ionic Strengths". (12th International Congress on the Chemistry of Cement, Montreal, 2007. Proceedings in press)

Denis Kalumba, Stephanie Glendinning, Chris D. F. Rogers, David I. Boardman, Mark Tyrer and Alan Atkinson (2007) "Dewatering of Tunnelling Slurry Waste using Electrokinetic Geosynthetics" (Poster) 6th Symposium on Electrokinetic Dewatering 12th-15th June 2007 Vigo, Spain (Proceedings in press)

Denis Kalumba, Stephanie Glendinning, Chris D. F. Rogers, David I. Boardman, Mark Tyrer and Alan Atkinson (2007) "Dewatering of Tunnelling Slurry Waste using Electrokinetic Geosynthetics" (Poster) 5th Annual British Geotechnical Association Conference, London, UK 13th June 2007.

R.Lupo, M.Tyrer., C.R.Cheeseman & S. Donatello (2007) "Manufactured Aggregates from Waste Materials" Proc. 1st International Conference on the Sustainable Construction Materials and Technologies, Coventry, UK. 11th-13th June 2007 Eds. Y. Chun, P.A. Claisse, T.R. Naik & E. Ganjian pp 763-767. Publ. Taylor & Francis

Denis Kalumba, Stephanie Glendinning, Chris D.F. Rogers, David I Boardman, Mark Tyrer & Alan Atkinson (2007) "Dewatering a Clay Soil using Electrokinetics" Resouce Efficiency Knowledge Transfer Network Conference "Designing Out Waste" 15th & 16th February 2007 Reading, UK (poster and extended abstract).

Richard Lupo, Mark Tyrer, Neil Tsang, Fintan McKeever and Chris Cheeseman (2007) "Manufacture of aggregates from waste silt and sand" Resouce Efficiency Knowledge Transfer Network Conference "Designing Out Waste" 15th & 16th February 2007 Reading, UK (poster and extended abstract).

A Dinsdale, H Davies, J Gisby M Tyrer "Thermodynamic modelling of cements" Materials Congress 2006 Institute of Materials Metals and Mining, London 5-7 April 2006.
See: <http://www.iom3.org/congress/images/process%20optimisation%20programme.pdf>

Rosemary Greaves, Mark Tyrer, Alan Atkinson (2006) "Gypsum Waste Reduction" Proc. 3rd WARMNET Conference "Tackling Waste" University of Nottingham, UK, 6th & 7th July 2006. Abstract 1.7.

Rosemary Greaves, Mark Tyrer, Alan Atkinson, Peter Claisse, Esmail Ganjian, Seema Karami, Gurmel Ghataora, Waliur Rahman. (2006) "Early age studies of sulphate activated pozzolans" Proc. WASCON 2006 (Sixth International Conference on the Environmental and Technical Implications of Construction with Alternative Materials. Belgrade, Serbia, 30th May – 2nd June 2006). pp.361-369 ISCOWA (Publ.) ISBN 86-908815-0-6 See: <http://www.iscowa.org/wascon2006/>

E. Ganjian, P. Claisse, M. Tyrer, A. Atkinson (2005) "Red gypsum in controlled low-strength material (CLSM)" Sborník mezinárodního sympózia Proc. 2nd International Symposium Non-Traditional Cement & Concrete 14th – 16th June Brno, Czech Republic. *Proceeding in print*: ISBN 80-214-2853-8. See: <http://www.fce.vutbr.cz/stm/fracture/symposium2005/default.htm>

Eshmaiel Ganjian, Peter Claisse and Mark Tyrer (2006) Use of Unclassified Ashes as Controlled Low Strength Materials for a Novel Cementitious Landfill Liner AshTech (2006) 14th-17th May 2006. Birmingham, UK. ISBN: 978-0-9553490-0-3 *Proceedings in print*. See: <http://www.ashtech2006.org/>

Tyrer, M. (2005) 'Phase relationships in blended cements'. Proc. International Workshop "Mechanisms and Modelling of waste / cement interactions May 8-15 2005, Meiringen, Switzerland. pp.71 (Speaker) See: http://www.empa.ch/plugin/template/empa*/37071/--/l=1

Tyrer, M. (2006) "Reuse of Mineral Wastes" 2nd AIMRAP Panel Workshop on: Geoscience, Extraction and Processing, Application Technologies and Sustainability April 2006 at the National Coal Mining Museum for England, Wakefield, U.K. (Speaker) See: http://www.mirowww.co.uk/latest_news/latest_news.htm

Mark Tyrer, Rosemary Greaves, Alan Atkinson, Peter Claisse, Esmail Ganjian, Gurmel Ghataora, Waliur Rahman. (2005) "Gypsum Waste Minimisation", Mini-Waste III, Transferring the Knowledge; Delivering the Benefits, Central Science Laboratory, York, U.K., 5th – 6th Dec. 2005 Abstr. B.2.40 (Speaker) <http://mini-waste.com> (Speaker)

Ganjian, E, Claisse, P, Tyrer, M, (2005) "Encouraging the use of mineral wastes in CLSM in the construction industry", Mini-Waste III, Transferring the Knowledge; Delivering the Benefits, Central Science Laboratory, York, U.K., 5th – 6th Dec. 2005. Abstr. B.3.40 See <http://mini-waste.com>

Rosemary Greaves, Mark Tyrer, Alan Atkinson, Esmail Ganjian, Peter Claisse, Waliur Rahman, Gurmel Ghataora. (2005) "Gypsum Waste Reduction" (Prize winning Poster) Mini-Waste III Conference, Central Science Laboratories, York December 2005. See <http://mini-waste.com>

Ganjian E, Claisse P A, Tyrer M and Atkinson A, (2005) "Use of secondary waste minerals as a novel low-cost cementitious landfill liner", 2nd International Conference on Concrete and Development, Tehran, Iran, pp. 125-139, 30th April – 2nd May 2005.

Claisse P A, Ganjian E, Tyrer M and Atkinson A, (2005) "Using Sulphate Activated Pozzolans in Controlled Low Strength Materials", Open Paper Session, ACI Convention, New York, USA, 19th April 2005.

Tyrer, M.; Atkinson, A; Claisse, P.A. & Ganjian, E. (2005) "Autogenous crack healing in a cementitious waste containment system" Accepted for publication. International conference on the chemical modelling of cements Meiringen, Switzerland. April 2005 (Speaker)

Q. Chen, Hills, C.D., Tyrer, M., Slipper, I. and Brough, A.R. "Hydration and Carbonation of Tricalcium Silicate in the Presence of Heavy Metals: An Examination of Crystalline Phases". Proceedings Int. 23rd Cement and Concrete Science Conference, September 8 - 9th 2003, University of Leeds. Cement and Concrete Science. (2003)

Claisse P A, Ganjian E, Tyrer M and Atkinson A, (2004) "Waste to Contain Waste – Containment Systems for Pollution Prevention", Society of Chemical Industry conference: Waste Materials in Construction, London, 1st April, 2004.

Claisse, P A, Ganjian E, Atkinson A, and Tyrer M., (2003) "Recycled Materials in Concrete Barriers", ACI special publications Vol SP212-59. Proc. 6th Canmet/ACI conference on the Durability of Concrete, Thessaloniki, Greece, pp.951-971, June 2003.

Claisse, P A Atkinson A, Ganjian E and Tyrer M. (2003) 'Performance criteria for concrete as a barrier for leachate in waste containment' Proc. International conference on the performance of construction materials, Cairo, Egypt, Feb. 18-20 2003 . ISBN 977-237-192 pp.1135-1144

Strusevich, D, Tyrer, M.; Atkinson, A; Claisse, P.A. & Ganjian, E. (2002) 'Sorption-Desorption of arsenic during leaching of ferrosilicate slags'. Int. Conf. Thermodynamic Speciation Modelling. Salford, U.K. (Speaker)

Williams., M, Tyrer., M.; Atkinson., A; Claisse., P.A. & Ganjian., E. (2002) 'Durability of novel concretes in contact with landfill leachate' Inst. Mats. 21st Cement & Concrete Science Symposium, Chatham, Kent., UK 2nd&3rd September 2002.

Chen., Q. Hills., C.D. & Tyrer., M. (2002) 'The Influence of Heavy Metals on the Hydration and Carbonation of Ordinary Portland Cement' Inst. Mats. 21st Cement & Concrete Science Symposium, Chatham, Kent., UK 2nd&3rd September 2002 (Speaker)

Claisse P.A.; Ganjian.,E.; Atkinson.,A. & Tyrer M. (2002) 'Site Trials of concrete barriers for landfill liners'. In 'Research in Progress' ACI Spring Convention. Detroit, Michigan USA 22nd April 2002

Claisse P.A.; Ganjian.,E.; Atkinson.,A. & Tyrer M. (2001) 'Novel Composite Landfill Liners (Oral presentation) at 'Cements in Waste Management'. Society Of Chemical Industry, London 26th April 2001

Tyrer M, Ganjian E, Claisse P A, and Atkinson A 'Novel Composite Landfill Liners' SCI conference: Cements in Waste Management, London, 26/4/2001. (Poster)

Tyrer., M.; Atkinson., A; Claisse., P.A. & Ganjian., E (2000) 'Novel Composite Landfill Liners' Inst. Mats. 20th Cement & Concrete Science Symposium, Sheffield, Yorkshire, UK 11th & 12th September 2000. (Poster)

Claisse., P.A. ; Ganjian., E.; Tyrer., M. & Atkinson., A; (2000),'Concrete without calcium or silica'(Oral presentation and paper in proceedings) British Cement Association Concrete Communication Conference 2000, Birmingham, UK, 29th -30th June 2000 pp.117-122, ISBN 0 7210 1570 0

Tyrer., M.; Atkinson., A; Claisse., P.A. & Ganjian., E. (2000) 'Novel Composite Landfill Liners' (Oral presentation and paper in proceedings) GREEN 3 Conference, Berlin, Germany 21st - 23rd June 2000 Paper 4.17 Thos. Telford (Publ.) London (Speaker)

Claisse., P.A. ; Ganjian., E.; Tyrer., M.& Atkinson., A., (2000), 'Novel Composite Landfill Liners' (Poster) Ceremony to mark the naming of the Sir John Laing Building, Coventry University, 13th June 2000

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A. Sneyers, S. Labat, P. Van Iseghem, M. Paul, E. Lachowski, F. Glasser, M. Tyrer, (1999) "Clay-cement reactions: first experimental and modelling results from the Mol test site" EURADWASTE '99, Radioactive Waste Management Strategies and Issues (Ed. C. Davies). Fifth European Commission Conference on Radioactive Waste Management and Disposal and Decommissioning (Conference held 15-18 November 1999, Luxembourg), p. 419-422

Tyrer., M.; Atkinson., A; Claisse., P.A. & Ganjian., E. (1999) 'Novel Composite Landfill Liners' (Poster) Minerals Industry Research Organisation Meeting CERAM Research, Stoke on Trent, Staffs UK 17th May 2000. (Poster)

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L Tweedie, M Tyrer, AJ Smith, Z Malik, R Spence, D Read and S Asahara (1997), "The Use of Interactive Histogram Visualisation in the Interpretation of Complex Geochemical Data Sets", in Proc Migration '97, Sendai, Japan, pp: 26-31.

Bennett., D.G.; Read., D.R.; Thomas., J.B. & Tyrer., M. (1994) 'The role of colloids in mediating radionuclide solubility and transport in the geosphere' Int. Conf. on Isolation of Radioactive Wastes in Geological Formations, Kiev, Ukraine. (Speaker) GOSCOMATOM/Uk.Nat.Acad.Sci (English abstract.)

Tyrer., M (1994) *Invited Lecture*: 'Radionuclide Transport in Rocks' NPL Radiation Science Colloquium, 16th Feb 1994. National Physical Laboratory, Teddington, UK. (Speaker)

Bennett.; D.G. Read.,D.; Tyrer., M.; Quillin., K & Duerden., S.L. (1993) 'Prediction of the interactions between blended cements and natural groundwaters' Institute of Materials annual conference 'Chemistry and microstructure of cement and concrete' University of Aberdeen. (Speaker)

Tyrer., M. (1993) 'Geochemical modelling applications to the degradation of building materials' Geological Society of London Engineering Group, Burlington House, 7th Dec. 1993. (Speaker)

4) Peer reviewed technical reports

Hills, C.D., Barnard, L.H., Bone, B., Carey, P.J., Jones, H.M., Boardman, D.I., Tyrer, M. and MacLeod, C.L. (2004). The science of stabilisation/solidification technology. Accompaniment to the guidance document (in press) based on Review of Remedial Performance of Stabilisation/Solidification Technology (Final Draft). Report for the Environment Agency (Contract Reference P5D (99) 02), 1st January 2004. Centre for Contaminated Land Remediation, University of Greenwich, UK.

Adrian Wilkinson, Les Balmer, Alan Gibbon & Mark Tyrer (2004) "Aggregate Grading in an Ultrasonically Maintained Suspension" DTI / MIRO Report MA/2/1/005 Mist Programme (Minerals Industry Sustainable Technologies)

F. Adenot, C. Maxoin, C. Tognazzi, P. Bredy, X. Bourbon, P.J.C. Bloem, J. Fachinger, L. Abdou, A. Sneyers, S. Labat, P. Van Iseghem, G. Marx, C. Altenhein-Haese, H. Bischoff, K. Brodersen, M. Cowper, F.P. Glasser, M. Paul, C.L. Dickson, D. Reed, M. Tyrer, (2001) "Barrier Performance of cements and concretes in nuclear waste repositories " . EUR 19780, 2001.

Glasser, F.P. (co-ordinator), Adenot, F., Bredy, P.J.C. Bloem, Fachinger, J., Sneyers, A., Marx, G., Brodersen, K., Cowper, M., Tyrer, M. et al. (2001) "Barrier performance of cements and concretes in nuclear waste management." Final Report for CEC contract FI4W-CT96-0030)

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Glasser F. P., Tyrer M., Quillin K., Ross D., Pedersen J., Goldthorpe K., Bennett D. and Atkins M. The Chemistry of Blended Cements and Backfills intended for Use in Radioactive Waste Disposal, Report P98. Environment Agency, Bristol, UK, 1999.

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D.G. Bennett, M.B. Crawford, A. Hall, W. Hummel, D. Read, D.M. Ridge, E. Tipping, M. Tyrer and P. Warwick (1996). 'Modelling of complexation by high molecular weight organics, in CHEMVAL 2: A coordinated research initiative for evaluating and enhancing chemical models used in radiological risk assessment'. Commission of European Communities Report No. EUR 16648en, 1996.

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Tyrer., M. *et. al* (1995) "HMIP Assessment of Nirex Proposal Performance Assessment Project (Phase 2). Near Field and Chemical Flow Path Modelling" Rep. DoE/HMIP/TR-Z2-9 See also: 'The Independent' p1, 22.10.95, 'The Times' p3, 23.10.95 and 'The Daily Telegraph' p7, 23.10.95 and Western.,R and Wogelius., R., (1995-96) Proof of Evidence A1.38 and 1.43 at the Public Inquiry into the Sellafield Rock Characterisation facility, Cleator Moor, Cumbria, September 1995 – February 1996.

Following Wilkie's article ("The Independent" p1, 22.10.95) on our study of the likely performance of the proposed UK nuclear waste repository at Sellafield, this document was reviewed on the radio and television and mentioned in all the UK broadsheet newspapers. It was cited as Proof of Evidence by Western and Wogelius at the Public Inquiry into the proposed repository (See Hazeldine and Smythe "Radioactive Waste Disposal at Sellafield 1996, ISBN 085261524-8). For political reasons, publication as a paper was "strongly discouraged".

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5) Other publications

Editorial 'Waste-based concrete for landfill barrier trial', Quarry Management, January 2000, Page 8. 'Industry News' section

Tyrer., M Read., D & Duerden., S (1996) "AIMS - Assessment Information Management System' User guide" *A project concerning document and information management supporting the public inquiry into the Sellafield repository planning application.*

Tyrer., M. & Yunus., I (1995) 'Assessment of the geochemical impact of emplacing a concrete service road in a granite tunnel' c-in-c report to SKB, Stockholm, Sweden, as part of the Åspo underground laboratory site investigations.

Tyrer., M. & Shaw. I.McN., (1987) "Ion chromatography applications in cement chemistry" Proc. 5th Dionex Symp. on the Chromatography of ions. (Speaker) UMIST, Manchester.