

Name

Dr Binjie Hu

Personal Details

Lecturer in Chemical Engineering

Qualifications

PhD (Newcastle, UK), BEng (Dalian, China), AMIChemE

Contact

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Expertise Summary

I am from Dalian, China, where I gained my BEng. I obtained a PhD at the University of Newcastle upon Tyne, UK, working on Crossflow microfiltration of water in oil emulsions. From September 1999, I joined the University of Birmingham as a research fellow, where I extend my research area onto understanding hydrodynamics in different multiphase systems in stirred tanks using video techniques. The research was closely related to industry processes such as food formulation and heterogeneously catalytic reactions. Especially in reaction processes, the most recent developments include hydrodynamics in multiphase reactors, interfacial and transport phenomena and their role in chemical reactions.

I joined the Department of Chemical Engineering and Biotechnology, University of Cambridge as a Teaching Consortium Teaching Fellow in September 2007. I was involved in a wide range of undergraduate teaching, i.e design lecture for 3rd year undergraduate, supervising design project for both 2nd and 3rd year undergraduates, laboratory-based teaching and setting out and supervising exercises (mini projects) which serve as reinforcing the lecture materials, thus cover wide range of chemical engineering subjects.

My next step is to extend my research interest into different multiphase system applications, such as ionic liquids which have direct impact to our living environment.

Teaching

Undergraduate:

University of Nottingham Ningbo, China 2010- present

- Engineering Solid Mechanics (Module code EH1ESM)
- Process Engineering Fundamentals (Module code EH1PEF)
- Separation Process Fundamentals (Module code EH1SPF)
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University of Cambridge (2007-2010)

- Design lectures to 3rd undergraduate students
- Co-supervising 3rd year undergraduate design project.
- Co-ordinating and supervising 2nd year fluid lab
- Managing and supervising the Exercises for 2nd year and 3rd year Undergraduate students.

Postgraduate:

University of Birmingham (2000-2006)

- Co-supervising various MEng research projects

Major research interests

I want to establish my research in the following areas

Micro/Nano-materials Engineering

- Dispersion and characterisation of Micro-droplets
- Colloidal aggregation and separations combined with microfiltration

Green Engineering

- Develop a new apparatus to achieve better understanding on molecular interaction between solvents or phases.
- Chemical products formulation

Reaction Engineering

- Hydrodynamics and Hydrogenation in various catalytic three-phase (hydrogen/organic/catalyst) reactions

Recent publications

1. B. Hu and K Scott, "Microfiltration of water in oil emulsion and evaluation of fouling mechanism", *Chemical Engineering Journal*, 2008 vol:136 iss:2-3 pg:210 -220
2. B. Hu, A.W. Nienow, E. H. Stitt and A.W. Pacey. "Bubble sizes in agitated water-hydrophilic organic solvents for heterogeneous catalytic reaction", *Ind. Eng. Chem. Res.*, 2007, 46(13), pp 4451 - 4458; doi: 10.1021/ie070174q.
3. B. Hu and K. Scott, "Influence of membrane material and corrugation and process conditions on emulsion microfiltration", *Journal of Membrane Science*, 2007, Vol 294, issue 1-2, 30-39.
4. B. Hu, R. P. Fishwick, A. W. Pacey, J. M. Winterbottom, J. Wood, E. H. Stitt and A. W. Nienow, "Simultaneous measurement of in-situ bubble size and reaction rates with a heterogeneous catalytic hydrogenation reaction", *Chemical Engineering Science*. 2007, 62, pp 5392 - 5396; doi:10.1016/j.ces.2007.01.004, 2007.
5. B. Hu, A.W. Nienow, E. H. Stitt and A.W. Pacey, "Bubble sizes in agitated solvent/reactant mixtures used in heterogeneous catalytic hydrogenation of 2-butyne-1,4-diol", *Chemical Engineering Science*, 2006, Vol 61, issue 20, pp 6765-6774.
6. B. Hu, A.W. Pacey, E. H. Stitt and A.W. Nienow, "Bubble sizes in agitated air-alcohol systems with and without particles: turbulent and transitional flow", *Chemical Engineering Science*, 2005, 60, pp 6371-6377.
7. B. Hu, A.W. Nienow, and A.W. Pacey, "Bubbles in agitated protein solutions: the effect of agitation, pressure and protein type on bubble sizes and their break-up and coalescence at high air volume fraction" In *Food Colloids, Interactions, Microstructures and Processing*, Ed: E Dickinson, Royal Society of Chemistry, Cambridge, 2005, pp 466-481. (ISBN 0-85404-638-0).

Recent papers at Conferences, Workshops & Seminars

Conference Papers

1. A.W. Nienow, B. Hu, A. W. Pacey, J. M. Winterbottom and R. P. Fishwick, E. H. Stitt. "Bubble Sizes in Agitated Water-Hydrophilic Organic Solvents for Heterogeneous Reactions: Simultaneous Bubble Size and Reaction Rate Measurement", NAMF XXI, Park City, Utah, USA, June, 2007.
2. B. Hu, R. P. Fishwick, A. W. Nienow, A. W. Pacey, J. M. Winterbottom, J. Wood and E. H. Stitt, "Simultaneous measurement of in-situ bubble size and reaction rates with a

- heterogeneous catalytic hydrogenation reaction", 19th International Symposium on Chemical Reaction Engineering, September 3-6, 2006, Potsdam/Berlin, Germany, poster 175.
3. B. Hu, A.W. Pacey, E. H. Stitt and A.W. Nienow, "Bubble sizes in agitated air-alcohol systems with and without particles: turbulent and transitional flow", 7th International Conference on Gas-Liquid and Gas-Liquid-Solid Reactor Engineering, Strasbourg, 21-24 August 2005, poster 4.1.
 4. B. Hu, A.W. Nienow, E. H. Stitt and A.W. Pacey, "Bubble sizes in agitated solvent/reactant mixtures used in Heterogeneous catalytic hydrogenation", 5th International Symposium on Catalysis in Multiphase Reactors and 4th International Symposium on Multifunctional reactors, Eds: J. Levec and A. Pintar, Portorož-Portorose, Slovenia, June 15-18, 2005 pp 117-118 (ISBN 961-6104-07-1). [oral presentation]
 5. B Hu, A.W. Pacey and A.W. Nienow, "Bubbles in agitated protein solutions: effect of processing conditions and protein type on steady state bubble size at high air volume fraction", Food colloids 2004, Interactions, Microstructure and Processing. Harrogate, United Kingdom, 18-21 April 2004, Paper L-33.[oral presentation]

Conference Abstracts

1. A. W. Nienow, B. Hu, A. W Pacey, J. M. Winterbottom, R. P. Fishwick and E. H. Stitt, "Bubble sizes in agitated solvent/reactant mixtures used in heterogeneous catalytic hydrogenation", paper 667c, AIChE Conference 2006, Abstract and oral presentation.
2. B Hu, R. P. Fishwick, A.W. Nienow, A.W. Pacey, J. M. Winterbottom and J. Wood. (2006) "Engineering consideration in 3-phase heterogeneous catalytic hydrogenation reactions in stirred reactor", Nottingham, 19-21 June. Abstract and oral presentation.
3. B. Hu, A.W. Pacey and A.W. Nienow, E. H. Stitt, "Bubble size in air/ mixed solvents system in batch stirred reactors", The Johnson Matthey Symposium on Catalytic Technology (JMSCT), Nottingham, 19-21 June, 2006. Abstract and poster.
4. R. P. Fishwick, B. Hu, A. W. Nienow, A. W. Pacey, J. M. Winterbottom, J. Wood and E. H. Stitt, "Hydrodynamics and hydrogenation: solvent effects in catalytic three-phase reactions", The Johnson Matthey Symposium on Catalytic Technology (JMSCT), Nottingham, 19-21 June, 2006. Abstract and poster.
5. A. W. Nienow, B. Hu, A. W Pacey and E. H. Stitt, "Bubble sizes in agitated solvent/reactant mixtures used in heterogeneous catalytic hydrogenation", paper 413b, AIChE Conference 2005. Abstract and oral presentation.
6. B. Hu, A.W. Nienow, A.W. Pacey and E. H. Stitt, "Bubble size in air/alcohol/catalyst and air/ mixed solvents system in batch stirred reactors", The Johnson Matthey Symposium on Catalytic Technology (JMSCT), Nottingham, 5-7 April, 2005. Abstract and poster.
7. B. Hu, A.W. Pacey and A.W. Nienow, "The contribution of particles on bubble behaviour in agitated air-alcohol systems: turbulent and transitional flow", The Johnson Matthey Symposium on Catalytic Technology (JMSCT), Nottingham, 24-26 March, 2004, Abstract and poster.

Conference and Meeting Presentations

1. B. Hu, A.W. Nienow and A.W. Pacey, "Athena at Birmingham: How can one predict bubble size in different solvent/water mixtures", Athena meeting, Glasgow, UK, 6-8 November 2006.
2. R.P. Fishwick, B. Hu, J. M. Winterbottom, A.W. Pacey, A.W. Nienow and J. Wood, "Athena at Birmingham: Development of the Reactor", Athena meeting, Glasgow, UK, 6-8 November 2006.
3. B. Hu, A.W. Nienow and A.W. Pacey, "The effect of catalyst particles and mixed solvent on bubble size and mass transfer" Carmac meeting, Reading, UK, 24 May, 2006.

4. B Hu, R. P. Fishwick, A.W. Nienow, A.W. Pacek, J. M. Winterbottom, "Hydrogenation of 2-butyne,-1,4-diol: simultaneous bubble size and reaction rate measurement", Carmac meeting, Reading, UK, 24 May, 2006.
5. B Hu, R. P. Fishwick, A.W. Nienow, A.W.Pacek, J. M. Winterbottom, "Hydrogenation: simultaneous bubble size and reaction rate measurement" Athena meeting, Cambridge, UK, 22 -24 February 2006.
6. B. Hu, A.W. Pacek and A.W. Nienow, "Mixed solvent effect on bubble size without reaction", Athena meeting, Cambridge, UK, 22 -24 February 2006.
7. B. Hu, A.W. Nienow and A.W. Pacek, "Mass transfer and gas hold-up in agitated solvents used in catalytic hydrogenation" Athena meeting, Birmingham, UK, 28 -30 September 2005.
8. B. Hu, A.W. Nienow and A.W. Pacek, "Bubble sizes in agitated solvents used in catalytic hydrogenation", Athena meeting, Chicago, USA, 31May – June, 2005.
9. B. Hu, A.W. Pacek and A.W. Nienow, "Bubble size in air/alcohol, air/alcohol/catalyst and air/ mixed solvents system in batch stirred reactors", Athena meeting, Yarm, UK, January 18-19, 2005.
10. B. Hu, A.W. Nienow and A.W. Pacek, "The effect of catalyst particles on bubble size in agitated air/alcohol systems", Athena meeting, Paris, France, 13-14 July, 2004.
11. B. Hu, A.W. Pacek and A.W. Nienow, "The contribution of particles on bubble behaviour in air-alcohol system", Athena meeting, Berlin, Germany, 4-5 January, 2004.