

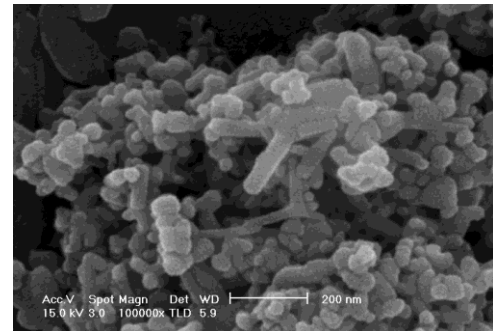
Dispersion of Nanomaterials in Liquids AN INDUSTRIAL CONSORTIUM BY BHR GROUP

BHR Group launched the industrial consortium DOMINO in October 2007. DOMINO aims to meet the current and future needs of its industrial members in the areas of **incorporation and dispersion of nanoparticles in liquids**, **delamination of nanoclays** and **nanoemulsions**.

DOMINO aims to develop process design procedures based on the experimental and numerical findings of the project, thus enabling member companies to take to market novel products with nanomaterials in their formulation.

The Process and Technical Focus

- Incorporation and suspension of nanoparticle clusters
- Deagglomeration of nanoparticle clusters
- Intercalation and exfoliation of nanoclays
- Nanoemulsions: break up of immiscible liquids using energy intensive devices in the presence of nanoparticles or nanoclays
- Dispersion rheology
- Numerical modelling of flow through different process devices and the break up process
- Stabilisation



The Consortium

DOMINO is funded and steered by industrial members. This ensures that the workprogramme meets the current and future needs of industry. Workplans are defined in discussion with members, proposed on an annual basis and finalised considering the feedback from members.

The Work Programme

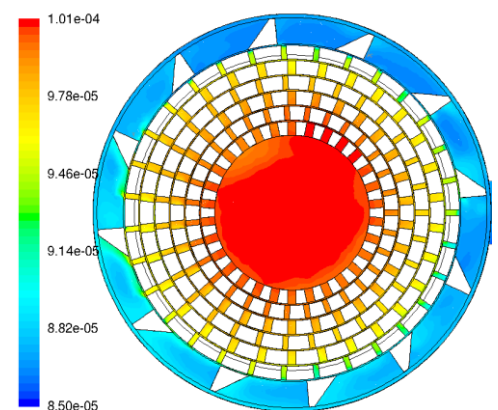
The programme comprises experimental studies, numerical modelling and development of design procedures. The areas covered have expanded since its inception and typically incorporation, kinetics and mechanisms of break up are studied in relation to equipment design, geometry and material properties.

A selection of process devices used include:

- In-line and batch rotor-stators
- Stirred bead mills
- Ultrasonicator
- Microfluidics
- Stirred tanks

Dissemination

- Project meetings (twice a year)
- Confidential reports, reviews, design procedures
- Dissemination seminars

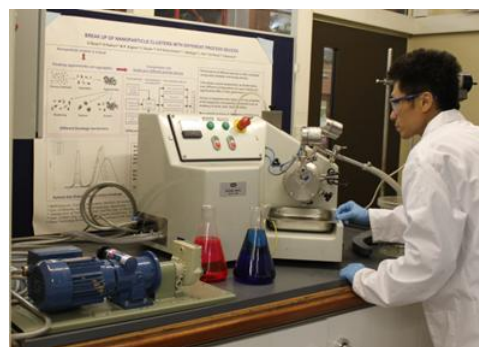


BHR Group and DOMINO

BHR Group is an independent industrial research and consultancy organisation with an international reputation and over 65 years' experience in the field of fluid engineering. It has extensive process engineering knowledge and expertise based on experimental and numerical research in the areas of fluid mixing, multi-phase flow and rheology. DOMINO builds on the expertise developed during several funded projects and collaborative industrial consortia including PROFORM (Transforming Nanoparticles into Sustainable Consumer Products through Advanced Product and Process Formulation), HILINE (High Intensity In-line Mixing) and FMP (Fluid Mixing Processes).

Benefits of Membership

- Access to all confidential results, findings, recommendations, experimental procedures, design procedures, computational models developed during the project
- Ability to steer the work programme
- 8 days free confidential consultancy
- Independent/impartial advice
- Bespoke training courses to implement project findings
- Secondment of staff to work alongside BHR Group staff
- Free access to DOMINO facilities
- Networking platform
- Access to all previously generated reports and data
- IP of any process developed from the data belongs to the individual member



Members and Collaborators

Current DOMINO members are from chemicals, consumer and health care companies and equipment manufacturers:

- Huntsman, Belgium
- Michelin, France
- Procter and Gamble, USA
- Solvay, Belgium
- Southern Clays Inc., USA
- Willy Bachofen AG, Switzerland
- Ytron Quadro, UK



DOMINO also collaborates with other organisations such as Meritics, representative of Beckman Coulter in the UK, and world-wide respected academic and industrial consultants:

- Prof. J. Baldyga - Warsaw University of Technology, Poland
- Dr A. W. Etchells - AWE3 Enterprises, US

Future Plans

DOMINO is continually expanding its membership to increase the research available to its new and existing members. Future work is envisaged to cover new particle-liquid systems and process devices.

In addition, BHR Group is pursuing participation in EU and government funded projects to develop the current expertise.

For more information, visit our website: domino.bhrgroup.com

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