

# Micro and Nanotechnology

## RESEARCH, CONSULTANCY & TRAINING

BHR Group's expertise in dispersion and mixing processes, fluid separation, materials behaviour and fluid-material compatibility is helping industry to realise the promise of new materials, products and processes that micro and nanotechnology offer.

Many industrial sectors are already taking advantage of our research, consultancy, testing, modelling and training services that offer a unique combination of:

- Independent specialist expertise
- Industry focused solutions

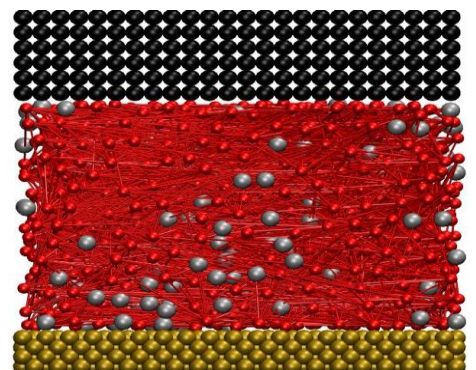
### Expertise

- Incorporation and dispersion of nanoparticles in liquids
- Intercalation and exfoliation of nano-clays
- Dispersion rheology
- Nanotribology of lubricants under high load conditions
- Permeation and diffusion of nanoparticles in polymers
- Fluid material compatibility and characterisation
- Microfluidic design for nanoparticles suspensions in liquids
- Nanocoating and substrate compatibility

### Our services include:

### Consultancy and Testing

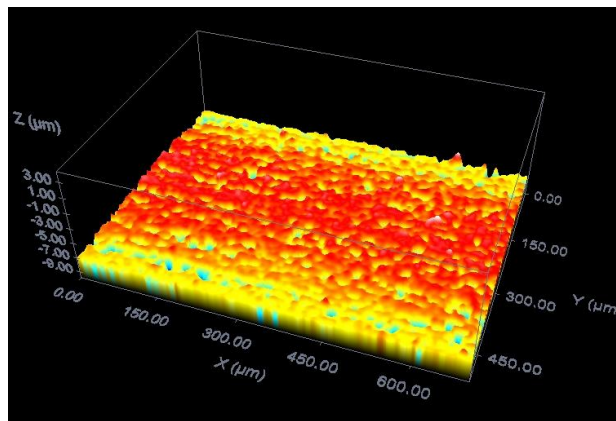
- Process design and/or equipment selection including scale up and scale-out
- Kinetics and mechanisms of break up of nanoparticle agglomerates
- Incorporation of fine powders into liquids
- Dispersion characteristics in relation to processing conditions
- Fluid and/or material selection and compatibility (liquids, polymers, metals)
- Nanotribology
- Mechanical behaviour of coatings



---

## Numerical modelling

- CFD modelling of flow through reactors
- Numerical modelling of breakage of nanoparticle agglomerates, nucleation, growth, agglomeration, and fate
- Molecular dynamics modelling of fluid processes
- Multi-scale modelling from atomic to continuum scale
- Coupled FEA/CFD modelling for fluid-material interactions



## Research

Our knowhow is developed through confidential research programmes, where the intellectual property is owned by BHR Group and its industrial partners. These programmes comprise:

- Collaborative research programme funded by industrial consortia
- Co-operative research programmes part funded by national government or EC and led by industry
- Single-client research focussed on a specific client's needs

## Current Research Programmes

- AddNano – incorporation and stabilisation of nanoparticles and their tribological assessment as enhanced performance additives in engine lubricants
- DOMINO – dispersion of nanoparticles in liquids
- Kristal – application of nanocoatings onto compliant substrates and their effectiveness to reduce friction and wear
- Dynamics – microfluidic design of lab-on-chip device for rapid detection of pathogens in the water supply



Contact us for more information or visit our website [www.bhrgroup.com](http://www.bhrgroup.com)

G-01

---

Office contact information:

Telephone: +44 (0) 1234 750 422  
Facsimile: +44 (0) 1234 750 074  
Email: [contactus@bhrgroup.co.uk](mailto:contactus@bhrgroup.co.uk)  
Website: [www.bhrgroup.com](http://www.bhrgroup.com)

The Fluid Engineering Centre  
Cranfield, Bedfordshire  
MK43 0AJ  
United Kingdom



Global Experts in Fluid Engineering