

University of Nottingham - Industrial Microwave Processing Research Group



UNITED KINGDOM · CHINA · MALAYSIA

English name: **Industrial Microwave Processing
Research Group**

Original name: **The University of Nottingham**

Department: Faculty of Engineering

The University of Nottingham University Park
NG7 2RD Nottingham
United Kingdom

Research organisation: University, University of Applied
Science, Research organisation,

Website

www.nottingham.ac.uk/ncimp/

Related Technology Datasheet

For industry

Food production
Process development
Consulting
Efficient Processing

For research organisation

For Others

Technology transfer and dissemination
Research funding

Related Facility Datasheet

Technology

Application field

Equipment available

Dielectric characterisation

Microwave-Material interaction

Dielectric characterisation is central to the group's scientific capabilities as it allows us to probe the interaction of the electric field with the structure of the material. Measurement techniques include high and low temperature coaxial probes (up to 1400°C), hot cavity perturbation methods (up to 1400°C) and impedance spectroscopy (high and low temperature) for measurements across the RF frequency band.

The centre has also led the development of dielectric property systems for high pressure and temperature measurements (up to 400°C and 300 bar). Dielectric property measurements can be considered at micro, meso and macro scale with a spectrum of techniques required for effective characterisation of process materials. Dielectric capabilities at the NCIMP allow mechanistic understanding of electromagnetic interactions with the material microstructures whilst other techniques are used for bulk measurements for use in applicator and safe choke design for continuous operating systems.

Modelling and simulations

Simulation capabilities in both electromagnetic (FDTD) and material property (FD and FEM) and multi-physics codes

Our metrology facilities are supported by significant simulation capabilities in both electromagnetic (FDTD) and material property (FD and FEM) and multi-physics codes. Modelling capabilities include High Performance Computing (HPC) systems allowing complex tasks to be undertaken such as modelling entire process systems to microstructure scale. HPC utilises a cluster of computers which can work together to complete over 12 trillion calculations per second and therefore perform simulations which would take a year on a single PC in a few hours. Modelling can therefore be used to further investigate the fundamental micro-scale interactions and develop mechanistic understanding through to its role in industrial system design.

Experimental test systems

Microwave and RF generators

Experimental test systems are available from initial bench through to multiple tonne per hour pilot and commercial scale systems. Multiple microwave and RF generators are available from a few hundred Watts to 100kW in a single generator. Frequencies of 13.56 MHz, 27.12 MHz, 896 MHz, and 2.45 GHz are available with a total installed power of >600kW. The Centre has a significant number of specifically designed and generic heating applicators supported by a wide range of materials handling and safety systems to allow concepts to be developed from fundamental microstructure understanding to successfully validate models and deliver scale up studies at an industrially meaningful scale.

Name	Function	E-Mail	Expertise
Macchindra Hinge	Reserch	Send E-Mail	

Source:

<http://www.foodtech-portal.eu/index.php?title=Special:PdfPrint&page=University+of+Nottingham+-+Industrial+Microwave+Processing+Research+Group>