

Micromanipulation, Encapsulation and Transforming Chemical Engineering Research towards Product Development

Professor Zhibing Zhang FEng

School of Chemical Engineering, University of Birmingham,
Edgbaston, Birmingham B15 2TT, UK

Email: Z.Zhang@bham.ac.uk



Abstract

One active research area of chemical engineering is product engineering, which aims to develop high-valued products with special functionalities. Such products are normally made of a number of components in multiple phases, including particles, emulsion droplets and/or bubbles. The functionalities strongly depend on their chemical compositions, structures and molecular interactions, including their compatibility and storage stability.

A micromanipulation technique was invented by the author with colleagues at the University of Birmingham in 1990, and has been used extensively to measure the mechanical properties of a wide range of biological and non-biological micro-particles, and to understand fundamental phenomena of various engineering processes involving these micro-particles. Moreover, new encapsulation technologies have been developed to make capsules that can achieve stabilisation and controlled release of different active ingredients, assisted by the powerful micromanipulation technique. This has led to commercialisation of a number of new products with microcapsules with direct industrial applications in pharmaceutical, agrochemical, nutraceutical, fabric care and consumer care. The details of these research works will be presented.

Short Biography

Prof Zhibing Zhang (ZZ) BEng MSc PhD DSc CEng FICHEME FEng is Professor of Chemical Engineering, Leader of Group of Micromanipulation and Microencapsulation in the School of Chemical Engineering, and Co-Director of the China Institute in the University of Birmingham.

ZZ obtained his BEng in Chemical Engineering from Hefei University of Technology, China in 1982, MSc and PhD in Chemical Engineering from East China University of Science and Technology (ECUST), Shanghai in 1985 and 1988 respectively, and moved to the University of Birmingham, UK in 1989.

ZZ is an Assessor for IChemE Accreditation, a member of the Editorial/Advisory Boards of 3 international journals, a member of EPSRC Peer Review College and Engineering Panel, Assessor of the Chinese Academy of Sciences, and Director of Microforce Measurement Ltd, UK.

He has served as a panel member for IChemE Accreditation, UK representative to the Management Committee of European COST 840 on Bioencapsulation Innovation and Technologies, and member of Consumers and Diversified Committee of Controlled Release Society, and technical consultant of >20 international/national companies. He has collaborated with > 40 international and national companies, and his research has contributed to commercialisation of a number of functional products which are sold worldwide.

He has published >180 peer reviewed papers and >260 other publications including book chapters, conference papers and patents, and given a large number of plenary, keynote and invited lectures at international/national conferences, academic institutions and companies.