

# 生化工程国家重点实验室邀请报告

报告人: Cordelia Selomulya

时 间: 9月4日上午9: 30

地 点: 生化科研楼一层会议室



## Assembly of Functional Particles via Spray Drying

A/Prof. Selomulya's group has developed an assembly approach for functional particles with tightly controlled characteristics and sizes in a scalable, waste-free process, utilising a microfluidic spray-drying device at Monash University (the only facility of its kind in Australia). The synthesis route is capable of effectively producing functional particles with uniform properties for various applications. Examples include thermal sensitive and bioactive particles, microparticles for controlled release and microencapsulation, magnetic and fluorescent composites, as well as mesoporous microspheres with hierarchical structures and properties comparable or superior to those observed on nanomaterials. The synthesis method is applicable to other self-assembling systems and could be a cost effective, energy and material-efficient route to produce powders with better functionality and ease of handling, with potential technology transfer to functional foods and therapeutics industry, as well as for applications in catalysis or bio-adsorption.

**BIOGRAPHY:** Cordelia is an associate professor at the Department of Chemical Engineering, Monash University. She is an active researcher in particle technology, focusing on materials synthesis such as controlled-release particles for pharmaceutical applications, the manufacturing of high-value dairy products in collaboration with the Australian dairy industry, and the applications of smart particles in therapeutics and vaccine delivery. Before joining Monash University, she was a Royal Academy of Engineering Anglo-Australia Postdoctoral Fellow at the Institute of Particle Science and Engineering, Leeds University, and a Research Fellow at the ARC Centre of Excellence at the University of New South Wales. She was recently selected into the Monash Research Accelerator program for 2013-2014 aimed at high performing researchers with potentials to be future leaders in their fields.

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报告人: Meng Wai Woo

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## **Making ultrafine uniform particles with ethanol vapour**

Conventional spray drying uses hot air to dehydrate moisture from atomized droplets. This process has been used to make milk powder and other food and pharmaceutical powder products. Typically, each droplet dehydrates into single particles. We have developed a new drying technique which can produce hundreds of particles within each atomized droplet. This can potentially mean that more uniform and fine droplets can be produced via spray drying without the need to employ very fine atomization. The technique employs ethanol vapour instead of just hot air and induces the precipitation mechanism within the droplet. Experiments with sugars and starches show that very uniform and fine spherical particles can be produced. Employing the technique to proteins even produced sub-micron particles. Preliminary experiments were undertaken on the technique to produce ultrafine microencapsulate.

**BIOGRAPHY:** Wai is a Lecturer in the Department of Chemical Engineering in Monash University. He completed his PhD in Malaysia and was a research fellow in Monash prior to taking up his current position. His research area is on spray drying and computational fluid dynamics. In the area of spray drying, his focus is on producing particles with specific functions. His other research area is on computational fluid dynamics simulation of industrial processes.