

# MSE-Colloquium@NTU

19 July 2018, 3:00 pm

MSE E-Studio (N4.1-B2-02), Nanyang Technological University, Singapore



## Oriented Assembly of Functional Mesoporous Materials with Multi-Level Architectures

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### Abstract

Functional mesoporous materials with multi-level architectures possess unique properties of high surface area, large pore channels and volume based on mesostructures, and abundant optical, electrical, magnetic properties, showing great potential applications in catalysis, adsorption, separation, biomedicines, etc.

Here, we present the development and progress in the synthesis of spherical functional mesoporous nanoparticles from a novel “oriented assembly” strategy by interfacial control. A series of new synthesis approaches was developed based on the oriented assembly strategy in my group, including the confined micro-emulsion self-assembly, liquid-liquid bi-phase synthesis, evaporation-driven oriented/aggregation assembly, anisotropic growth of mesoporous, and interface driven orientation arrangement, etc.

Novel mesoporous nanospheres with one-level and multi-level architectures can be well synthesized, such as core-shell, yolk-shell, multi-shell structures for silica, TiO<sub>2</sub>, carbon spheres, 3D mesoporous bouquet-posy-like TiO<sub>2</sub> multi-level superstructures and asymmetric Janus, single-hole hollow, nano-thermometer, hemispheres structures, etc. The obtained functional mesoporous nanospheres with regular multi-level architectures possess uniform and controllable mesopore channels, high surface area, large pore volume and open framework, showing great potential applications in catalysis, adsorption, separation, photoelectric conversion and biomedicines.

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## Biography

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Born in northeast China, Professor Zhao Dongyuan received his B.S. (1984), M.S. (1987) and PhD (1990) from Jilin University. He was a post-doctoral fellow in the Weizmann Institute of Science (1993–94), University of Houston (1995–96), and University of California, Santa Barbara (1996–98). Now, he is a Professor (Cheung Kong and Hao-Qing Professorship) in the Department of Chemistry at Fudan University.

He was a member of the Chinese Academy of Sciences and The Third World Academy of Science (TWAS), Council Member of IZA, and the President of the International Mesoporous Materials Association (IMMA). Professor Zhao has received many awards, such as the TWAS Lenovo Science Prize (2016), CNR Rao Award from India Chemical Research Society (2013), Muettetries Memory Award (2012), The Ho Leung Ho Lee Award (2009), TWAS Prize (2008), IMMS Award (2008) and DuPont Award (2005). He is now the Senior Editor of *ACS Central Science* and has also served as the Editor-in-Chief of *Journal of Materials Chemistry*, and is the co-editor of *Journal of Colloids and Interface Science*. He has published more than 600 peer-reviewed papers, 40 patents and is listed as one of the highly cited researchers in ISI in both Chemistry and Materials Science (total citation ~ 85,000, h-index 141). His research interests mainly include designed synthesis, assembly, structure and application of ordered mesoporous materials.



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