附件1：第十届中日化工学术研讨会投稿格式

**MS-01: Co-option of sulphur-transfer machinery from primary metabolism for 2-thiosugar biosynthesis**

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**Abstract (~300 words)**: For C-S bond formation in primary metabolites, the major ionic sulfur sources are the protein-persulfide and protein-thiocarboxylate. For each case, the persulfide and thiocarboxylate group on these sulfur-carrier proteins are post-translationally generated through the action of a specific activating enzyme. In all bacteria reported so far, genes encoding the enzyme catalyzing the actual C-S bond formation and its cognate sulfur-carrier protein co-exist in the same cluster. To study 2-thiosugar production in BE-7585A, an antibiotic from *Amycolatopsis orientalis*, we identified a putative 2-thioglucose synthase BexX, whose protein sequence and mode of action appear similar to those of ThiG, the enzyme catalyzing thiazole formation in thiamin biosynthesis. However, no sulfur-carrier protein gene could be located in the BE-7585A cluster. Subsequent genome sequencing revealed the presence of a few sulfur-carrier proteins likely involved in the biosynthesis of primary metabolites, but surprisingly only a single activating enzyme gene in the entire genome of *A. orientalis*. Further experiments showed that this activating enzyme is capable of adenylating each of these sulfur-carrier proteins, and likely also catalyzing the subsequent thiolation. A proper combination of these sulfur delivery systems is effective for BexX-catalyzed 2-thioglucose production. The ability of BexX to selectively distinguish sulfur-carrier proteins is given a structural basis using X-ray crystallography. These studies represent the first complete characterization of a thiosugar formation in nature and also demonstrate the receptor promiscuity of the sulfur-delivery system in *A. orientalis*, which also provide evidence that exploitation of sulfur-delivery machineries of primary metabolism for the biosynthesis of sulfur-containing natural products is likely a general strategy in nature.

**Short Biography (~200 words):** Hung-Wen (Ben) Liu graduated with a BS degree from Tunghai University, Taiwan, and a PhD degree from Columbia University, USA. He then worked as a postdoctoral fellow at MIT. In 1984, he became an Assistant Professor in the Department of Chemistry at the University of Minnesota, and was promoted to the Distinguished McKnight University Professor in 1999. In 2000, Prof. Liu moved to the University of Texas at Austin, and currently holds the George Hitchings Regent Chair in Drug Design. Prof. Liu's research lies at the crossroads of chemistry and biology, and focuses on the elucidation of the chemical mechanisms of enzymes that catalyze mechanistically unusual and physiologically important steps in the biosynthetic pathways of natural products. He has earned many awards and is a Fellow of the American Association for the Advancement of Science, the American Academy of Microbiology, the Japan Society for the Promotion of Science, and the American Chemical Society. He serves on many review panels and editorial boards. At present, he is an Associate Editor of *Organic Letters*.

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附件2

**第十届中日化工学术研讨会**

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