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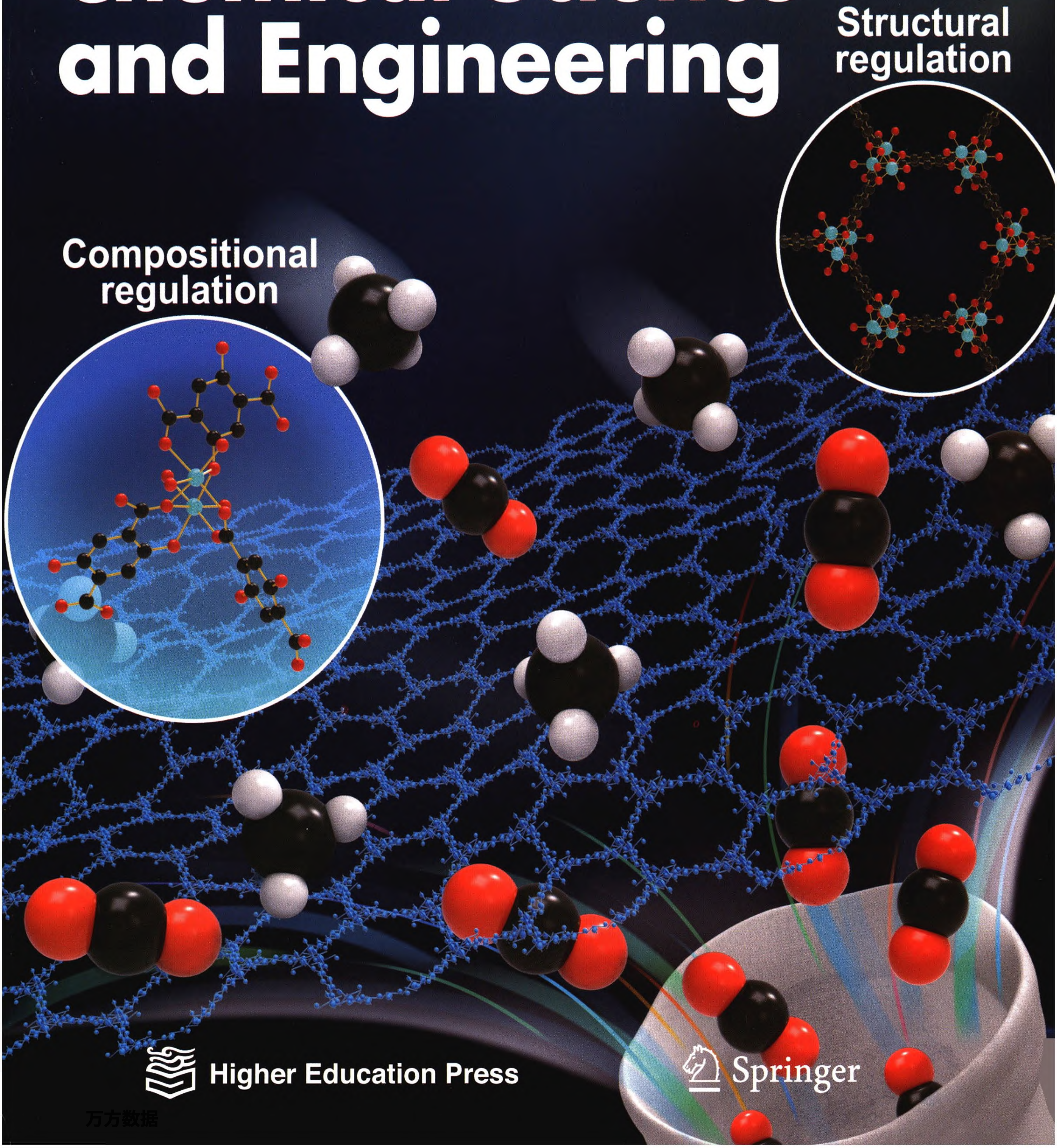

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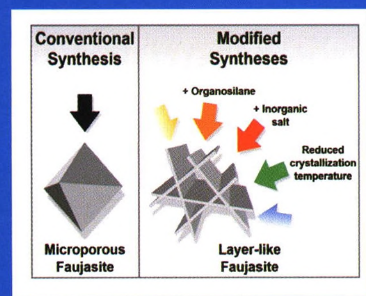

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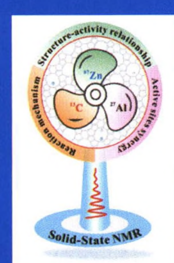

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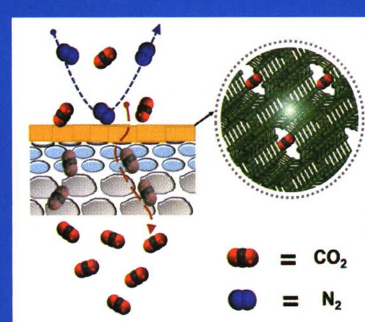

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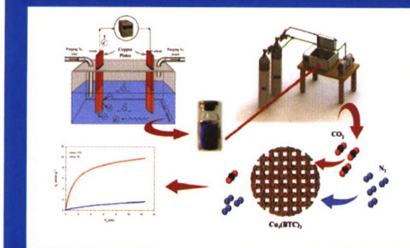

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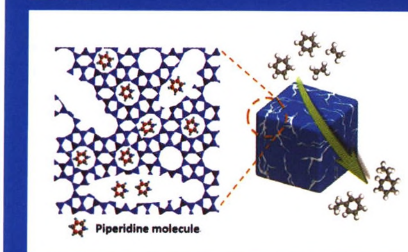

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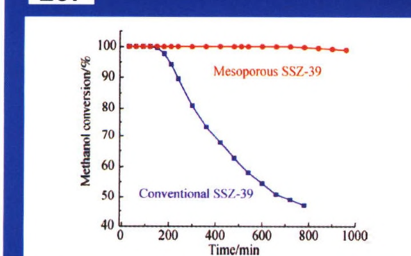

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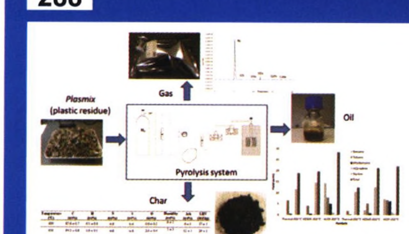

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Cover story

(Yujie Ban, Meng Zhao, Weishen Yang, pp. 188–215)

CO_2 capture is a hot topic in research and industry. It typically refers to the splitting of CO_2/N_2, H_2/CO_2 and CO_2/CH_4, and is one of the most desirable separation technologies in environment and energy sectors. Membrane-based separations are energy-efficient separation methods cutting the energy consumption of traditional distillation by nearly 90%, which offers hope for CO_2 capture. Metal-organic frameworks (MOFs) are a versatile platform with compositional and structural tunability, lighting the concept from precise material design to membranes for high-efficiency CO_2 capture. This review summarized compositional/structural design and regulation strategies of MOFs targeted at secondary building units (metal nodes and linkers), pore structure, topology and mixed-phase hybrid structures for achieving CO_2-philic MOF materials. And diversified methods were illustrated for construction of improved MOF membranes that can overcome the bottleneck of permeability-selectivity limitations.

Weishen Yang is a chair professor of Dalian Institute of Chemical Physics (DICP), Chinese Academy of Sciences (CAS), China. He received his Ph.D. from CAS in 1990. As a visiting scholar, he worked at Birmingham University (UK) in 1989, and the University of Southern California (USA) in 2001. He works on the rational design and molecular-level engineering of functional nanomaterials for applications in catalysis and separation (e.g., inorganic membranes).

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