Hydrogen Spillover in Encapsulated Metal Catalysts: Understanding and New Opportunities for Advanced Catalyst Design

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Hydrogen spillover has been one of the most debated concepts in the field of heterogeneous catalysis due to limited ways of studying it. The main controversies in hydrogen spillover, especially from the viewpoint of its catalytic functions, can be mainly attributed to the absence of well-defined model catalysts that can provide direct proof of the catalytic functions of hydrogen spillover. In this presentation, I will provide an overview of the recent progress made with encapsulated metal catalysts, which can act as an ideal model catalyst for proving the existence and catalytic functions of hydrogen spillover. We will also demonstrate unique opportunities of using the encapsulated metal catalysts for designing advanced hydroprocessing catalysts with enhanced activity, distinct chemoselectivity, and increased catalyst durability.