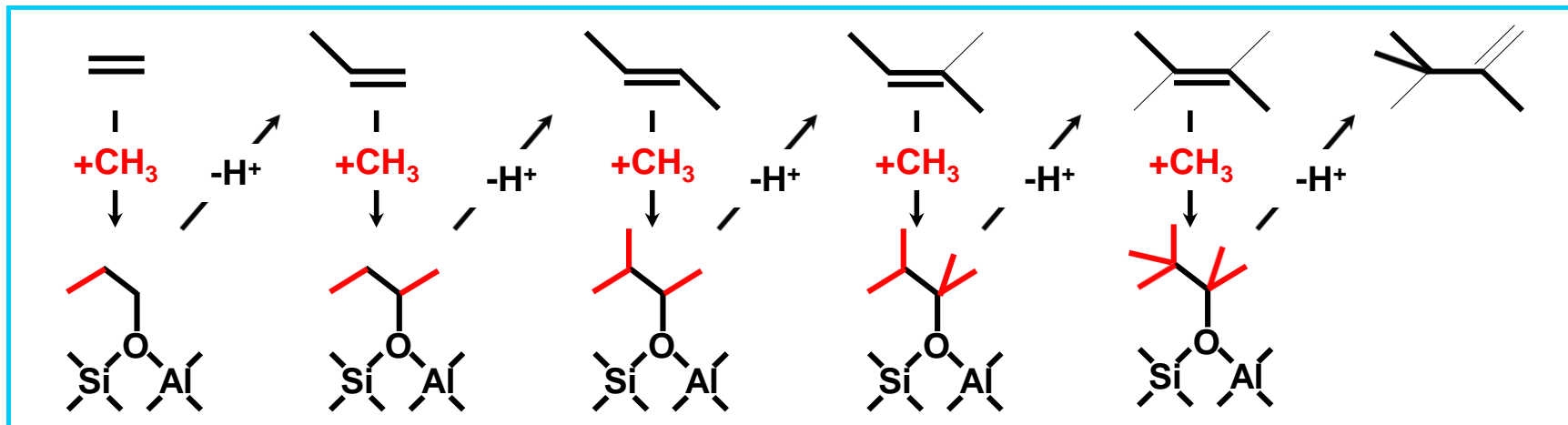


Selective Catalytic Synthesis of Branched C₄-C₇ Hydrocarbons by Low Temperature C₁ Homologation Reactions over Medium and Large Pore Acidic Zeolites

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The selective methylation of olefins by methanol results in the catalytic synthesis of branched C₄-C₇ compounds with high octane ratings primarily due to methylation and deprotonation resulting in the synthesis of the most highly substituted carbocation. Our investigations reveal that olefin methylation and cracking rates depend strongly on the zeolite structure, however, the mechanism of olefin methylation and cracking is similar across all zeolites. Olefin methylation rates increase systematically with increasing substitution of the carbocationic transition states involved and these methylation reactions involve surface methyls as reactive intermediates as evidenced in chemical titration and isotopic studies.

