

## Dual effects of supported W catalysts for dehydroaromatization of methane in the absence of oxygen

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The screening of a series of W-based catalysts on different supports i.e. HZSM-5, H $\beta$ , USY and Al<sub>2</sub>O<sub>3</sub> for the dehydroaromatization of methane (DHAM) revealed that HZSM-5 emerged as the best support. Next, the performance of W/HZSM-5 and W-H<sub>2</sub>SO<sub>4</sub>/HZSM-5 catalysts for the DHAM reaction was compared to study the effect of acidic treatment in the impregnation method. The results showed that the optimum activity of W-H<sub>2</sub>SO<sub>4</sub>/HZSM-5 catalyst exceeded that of W/HZSM-5 catalyst. Finally, the influence of Si/Al ratio in the W-H<sub>2</sub>SO<sub>4</sub>/HZSM-5 catalyst was studied and the catalyst with Si/Al ratio = 30 was found to be the most promising for the DHAM reaction. The remarkable activity of the catalyst is attributed to the presence of dual effects: suitable content of octahedral polymeric and tetrahedral monomeric tungstate species accompanied by proper amount and strength of acid sites in the catalyst.

**KEY WORDS:** dehydroaromatization; methane; W-based catalysts; tungstate species.

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