

# Method for Extending Catalyst Life in Methane DHA Reaction

**A regeneration strategy that restores Mo-MFI activity and extends catalyst life for methane-to-aromatics processing.**

Researchers at Purdue University have developed a method for regenerating molybdenum-zeolite catalysts for the methane dehydroaromatization (DHA) reaction. Methane DHA converts methane to aromatics and hydrogen. The primary issue with methane DHA with the Mo-MFI catalyst is the fast catalyst deactivation (after ~10 hours) and reduced performance upon regeneration. This is attributed to MFI framework dealumination during the regeneration cycle, reducing the number of ion-exchangeable Mo sites. The Purdue invention restores the initial activity of a partially deactivated Mo-MFI catalyst. By adding fresh catalyst consisting of MFI containing some amount of framework Al atoms and then subjecting the spent-fresh catalyst mixture to a regeneration cycle, all Mo species are regenerated to the active phase (Mo-carbides).

**Technology Validation:** When the researchers mixed spent Mo-MFI with fresh H-MFI and subjected it to the methane DHA reaction and regeneration cycle, benzene formation rate was restored to the initial value with the starting Mo-MFI catalyst.

## Advantages:

- Extends useful catalyst lifetime

## Applications:

- Petrochemicals production

**TRL:** 3

## Intellectual Property:

Provisional-Gov. Funding, 2023-06-16, United States | PCT-Gov. Funding,

2024-06-14, WO | NATL-Patent, 2025-12-12, United States

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