

# 51448-ND5: Novel mixed metal carbide catalysts for petroleum processing

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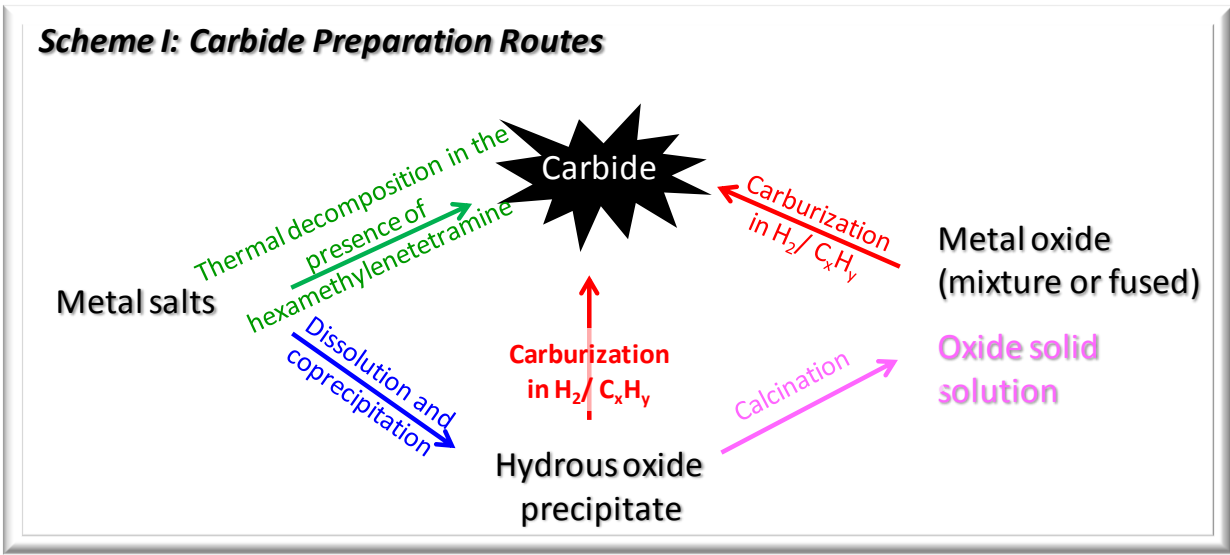
## Motivation

Metal carbides are promising materials for catalytic applications, particularly for reactions requiring harsh conditions such as the upgrading of heavy oils to transportation fuels

## Scientific problems

Carbides containing more than one metal have not been explored systematically for use as catalysts, although their compositional variety would allow tuning the catalyst properties

Carbide synthesis methods often require high temperatures, promoting crystal growth and reducing surface area (which is important for catalysis); milder conditions would be desirable



## Goals & Strategy

Synthesis methods for mixed metal carbides are being developed that are generally applicable and provide control over important product properties such as phase composition and surface area

## Results

Various synthesis routes for carbides (shown in Scheme I) were tested, and a novel promising co-precipitation route was identified

Single phase mixed carbides could be obtained

Testing of catalytic properties of novel carbides for hydrogenation and ring opening is underway