# Optimized Cu-Fe-ZSM-5 Catalyst for NOx Reduction: Performance and Commercial Feasibility for net zero emissions

**Shivani Shirke, Feng-Chih Chou, Yu-Zheng Wang, Shang-Cyuan Chen and Yuan-Chung Lin (Chinese Taipei)**

**Key words:** Young surveyor

**SUMMARY**

The need for a broader operating temperature range in NH3-SCR catalysts has become urgent in addressing air pollutants like NOx and particulate matter (PM). Current catalysts face challenges such as sulphur poisoning, limited temperature range, and difficulties with regeneration. This study presents an innovative and cost-effective bimetallic Cu-Fe catalyst on ZSM-5, synthesized with minimal metal content and optimized efficiency. The research further explores the feasibility of this Cu-Fe combination for commercial use. Compared to a commercially available zeolite, the self-synthesized Cu-Fe/ZSM-5 catalyst consistently achieved over 90% NOx removal across the entire test temperature range. It also demonstrated excellent resistance to sulphur poisoning, with NOx and PM emission levels significantly below Taiwan's regulatory standards, along with good N2 selectivity. Additionally, the study examines the cost-benefit analysis for industrial production, projecting an annual net profit of approximately 1.47 million USD for five parallel units.

---