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Electroreduction of CO_2 to Methane with Triazole Molecular Catalysts
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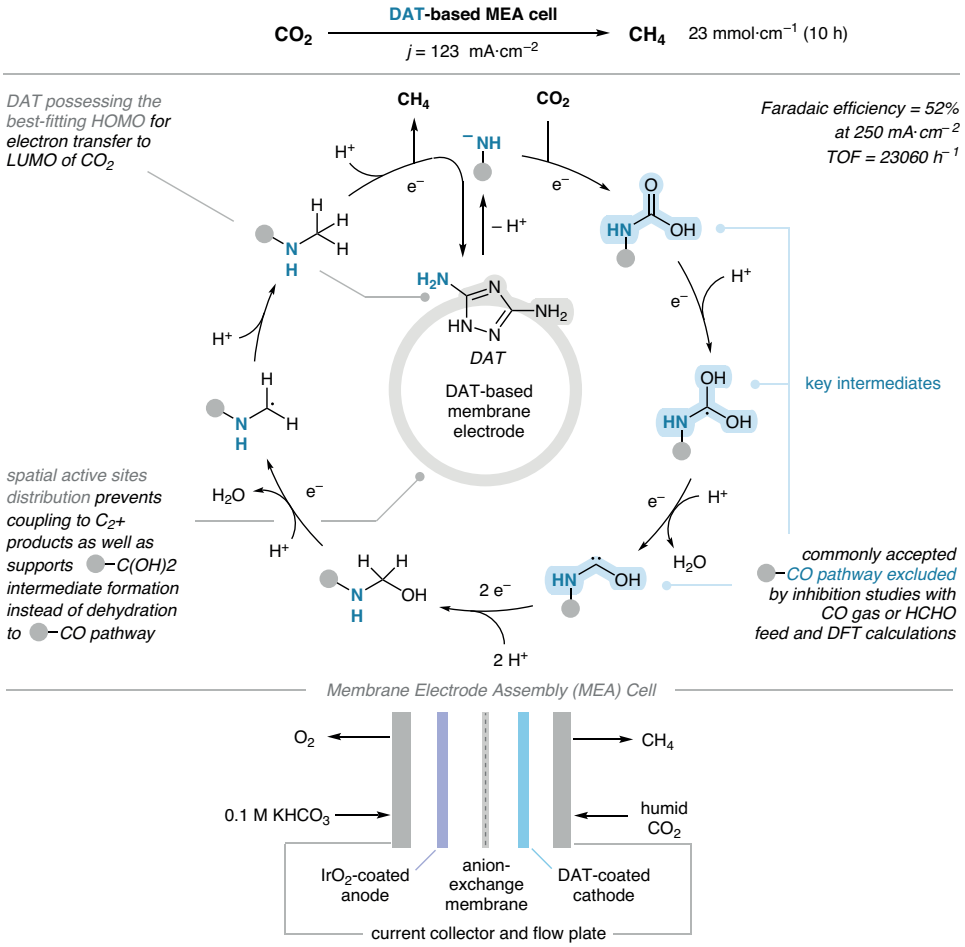
Electrochemical Organocatalytic Production of Methane



Significance: The authors report a diaminotriazole (DAT)-based electrochemical system for the reduction of CO_2 to CH_4. Unique chemical properties of DAT (high electron density and the presence of highly nucleophilic NH_2 groups) allow for efficient multiple electron transfer steps as well as for the formation of a spatial active site network, maintaining process selectivity. The achieved level of efficiency and activity of CH_4 prouction is comparable to state-of-the-art single-site metal-based systems.

Comment: The CO_2 reduction to methane is extremely challenging both kinetically and thermodynamically. Electrochemical reductions often additionally suffer from low selectivity due to poor control over key intermediates. The authors overcame these challenges by directing the reaction along a novel pathway with low-energy intermediates whose formation is triggered and controlled by DAT catalyst. Although this pathway requires further investigation, the demonstrated results are undoubtedly encouraging.

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Category
Organo- and Biocatalysis

Key words
CO_2 reduction (CO_2RR)
methane
diaminotriazoles
electrolysis

Synfact of the Month