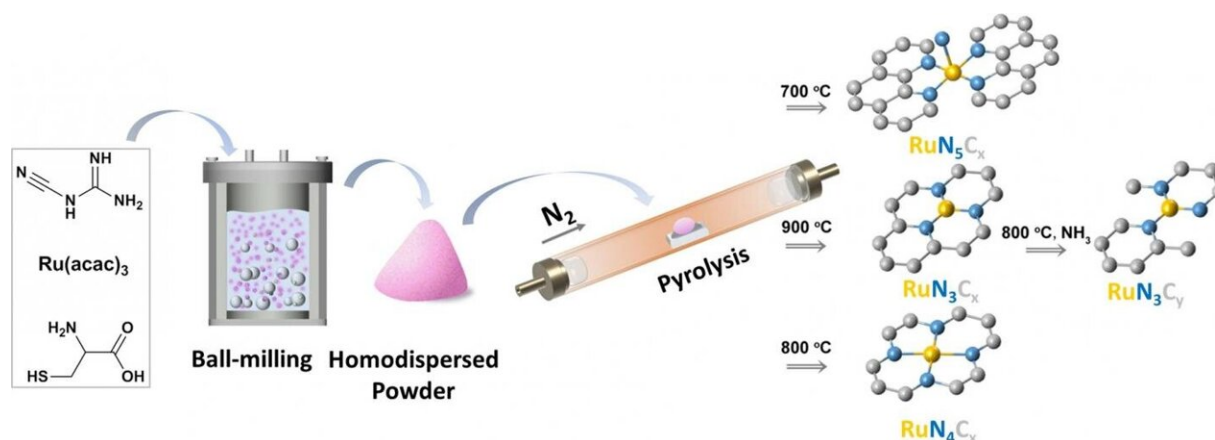


New single-atom catalysis boots reductive amination reaction

June 8 2021



Schematic illustration for preparation of Ru1/NC-T catalysts. Credit: DICP

The geometric isolation of metal species in single-atom catalysis (SACs) not only maximizes the atomic utilization efficiency, but also endows SACs with unique selectivity in various transformations.

The coordination environment of isolated metal atoms in SACs determines the [catalytic performance](#). However, it remains challenging to modulate the coordinative structure while still maintain the single-atom dispersion.

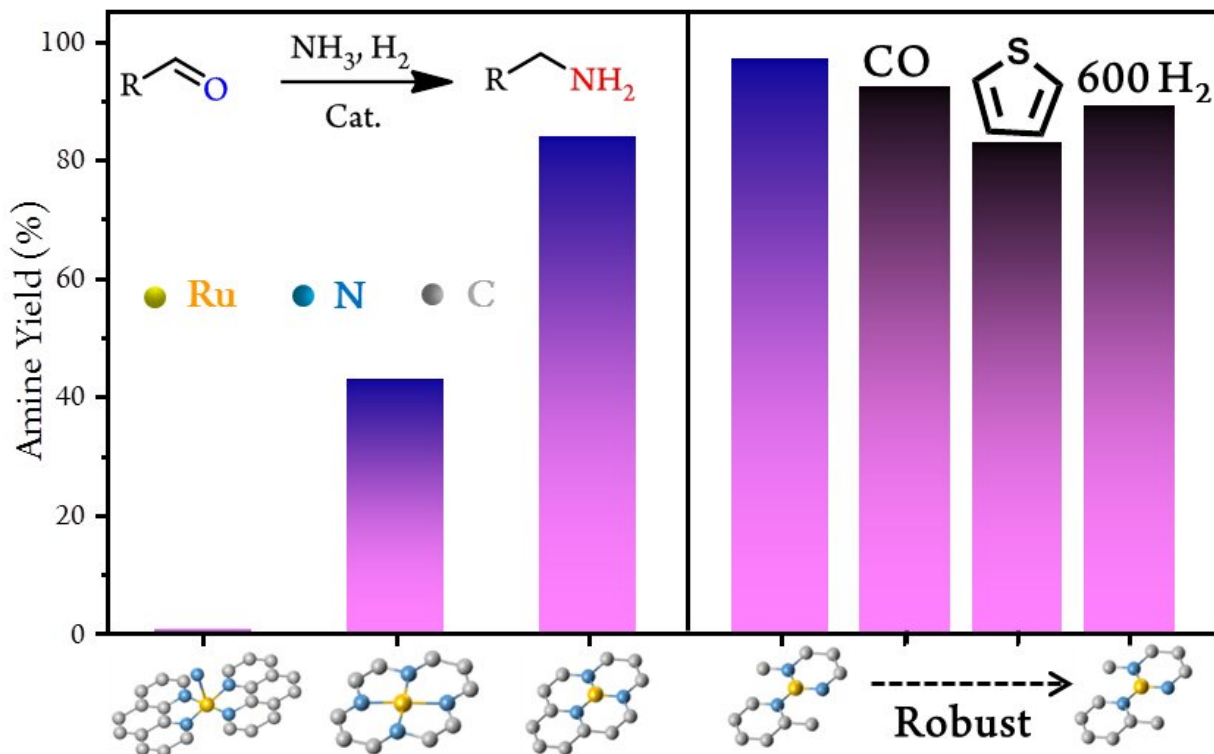
Recently, a research group led by Prof. Zhang Tao and Prof. Wang Ai Qin from the Dalian Institute of Chemical Physics of the Chinese

Academy of Sciences fabricated Ru₁/NC SAC with good catalytic activity, selectivity and stability in reductive amination of biomass derived aldehydes/ketones to produce primary amines, and elucidated the structure-performance relationships from the atomic/[molecular level](#).

This study was published in *Nature Communications* on June 2.

The researchers prepared Ru₁/NC SAC towards the target reaction, and discovered that both [catalytic activity](#) and selectivity increased with the decrease of Ru-N coordination numbers. Particularly, Ru₁/NC SAC with Ru₁-N₃ moiety offered the best catalytic performance, which was much superior to the ever reported nanoparticulate and homogeneous Ru catalysts.

Moreover, Ru₁/NC presented excellent durability against poisoning by CO or sulfur-containing compounds, and the single-atom dispersion was well maintained even after reduction under extreme conditions.



Highly selective and robust single-atom catalyst R1/NC for reductive amination of aldehydes/ketones. Credit: DICP

More information: Haifeng Qi et al, Highly selective and robust single-atom catalyst Ru1/NC for reductive amination of aldehydes/ketones, *Nature Communications* (2021). [DOI: 10.1038/s41467-021-23429-w](https://doi.org/10.1038/s41467-021-23429-w)

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