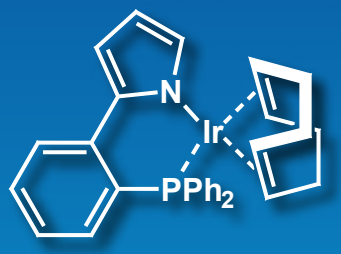
New

CHEMISTRY

Iridium Catalyst for Hydrogenolysis of Urea Derivatives to Formamides and Amines under Mild Conditions



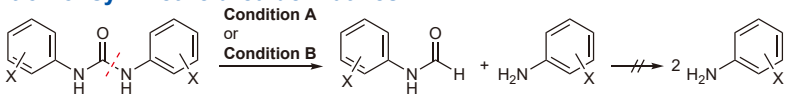
(1,5-Cyclooctadiene)-[2-(2-diphenylphosphinophenyl)-pyrrolido]iridium(I)
200mg
[C4021]

Advantages

- Decomposes urea derivatives into formamides and amines
- Can be used under mild conditions
- Applicable on gram scale or with very low amount of catalyst (0.09 mol%)

Applications

Decomposition of symmetric urea derivatives



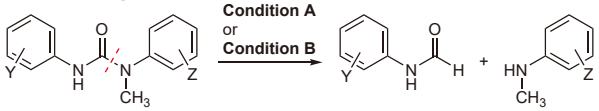
X = COOR, $CONR_2$, CN, NR_2, F, Cl, Br

C4021 can decompose urea derivatives into formamides and amines while retaining the reducing active functional group.

Condition A
C4021 (3 mol%)
H_2 (1 MPa)
THF, 130˚C

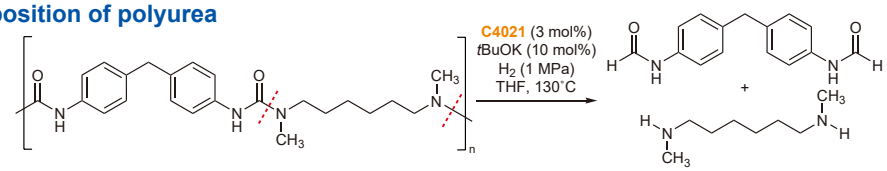
Condition B
C4021 (1-10 mol%)
*t*BuOK (10-33 mol%)
H_2 (1 MPa)
Toluene, 130˚C

Decomposition of asymmetric urea derivatives



In the case of unsymmetrical urea derivatives, C4021 cleaves the C-N bond on the side with more substituents at nitrogen with high selectivity.

Decomposition of polyurea



C4021 shows highly catalytic activity against polyurea, and can decompose polyurea in a manner different from conventional hydrogenation catalysts.

Reference T. Iwasaki, K. Tsuge, N. Naito, K. Nozaki, *Nat. Commun.* **2023**, *14*, 962. https://doi.org/10.1038/s41467-023-38997-2

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