



Pd/PVP- Catalyzed Formylation of Amines and Nitroarenes to N-Formamides with CO₂ and Dimethylamine Borane: The Influence of CO₂ on the Formation of Azoxyarenes

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Streszczenie

The reactivity of dimethylamine borane (DMAB) towards amines and nitroarenes was investigated in the presence of the CO₂ and Pd/PVP (PVP=polyvinylpyrrolidone) nanocatalyst. The formation of borane formate, Me₂NH.BH₂(OCHO), by the insertion of CO₂ into the B–H bond was evidenced by NMR. The reaction of DMAB with CO₂ also produced a second product, DMF, formed via self-formylation. In the presence of aromatic or aliphatic amines corresponding N-formamides were formed efficiently. Under the same conditions nitroarenes were hydrogenated to anilines or to azoxyarenes in the absence of CO₂. In both reactions very high TOF values, up to 30 min⁻¹, were obtained. Applying a higher excess of DMAB enabled the transformation of nitroarenes to N-formamides. The Pd/PVP catalyst was used in 7 consecutive cycles of N-methylaniline formylation with excellent selectivity and a total TON equal to 4700.

Słowa kluczowe

Dimethylamine borane, CO₂ reduction, Pd/PVP nanocatalyst, N-formylation, Transfer hydrogenation

Adres publiczny

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