Carbon monoxide as a C1 building block in fine chemical synthesis

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Abstract

Carbon monoxide (CO) has become one of the most relevant and versatile renewable C1 building blocks for chemical synthesis, especially in the fine chemicals industry, due to the development of efficient and selective catalysts for its activation. In this review, we present a comprehensive critical analysis of the last 10 years literature on the use of CO as a renewable feedstock for fine chemicals production. The review is organized by type of catalytic reaction, namely alkene and alkyne carbonylation, hydroformylation, carbonylation of aryl halides, carbonylative cross-coupling and C–H carbonylation. Notable examples of the synthesis of relevant building blocks and/or known pharmaceuticals are highlighted. Emphasis is placed on examples of utilizing CO as the C1 building block in one or more catalytic steps. The catalyst used and the reaction conditions are consistently presented throughout all of the examples.

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