

New palladium – ZrO₂ nano-architectures from thermal transformation of UiO-66-NH₂ for carbonylative Suzuki and hydrogenation reactions.

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The new nanocomposites, Pd/C/ZrO₂, PdO/ZrO₂, and Pd/PdO/ZrO₂, were prepared by thermal conversion of Pd@UiO-66-Zr-NH₂ (MOF) in nitrogen or air atmosphere. The presence of Pd nanoparticles, uniformly distributed on the ZrO₂ or C/ZrO₂ matrix, was evidenced by transmission electron microscopy, scanning electron microscopy (SEM), Raman and X-ray Photoelectron Spectroscopy (XPS) methods. All pyrolysed composites retained the shape of the MOF template. They catalyze carbonylative Suzuki coupling under 1 atm CO with an efficiency significantly higher than the original Pd@UiO-66-Zr-NH₂. The most active PdO/ZrO₂ composite, formed benzophenone with TOF up to 1600 h⁻¹, while by using Pd@UiO-66-Zr-NH₂, much lower TOF values, 51–95 h⁻¹, were achieved. After the reaction, PdO/ZrO₂ was recovered with the same composition and catalytic activity. Very good results were also obtained in the transfer hydrogenation of benzophenones to alcohols with Pd/C/ZrO₂ and PdO/ZrO₂ catalysts under microwave irradiation.

Słowa kluczowe

carbonylative Suzuki coupling, MOF pyrolysis g, palladium, PdO/ZrO₂ nanocomposites, transfer hydrogenation reactions

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