Asymmetric Michael Addition of Aldehydes to Nitroalkenes Using JH-CPP

Significance: A chiral porous polymer containing the Jørgensen–Hayashi catalyst (JH-CPP) was prepared by the Co$_2$(CO)$_8$-mediated trimerization of the ethynyl-modified Jørgensen–Hayashi catalyst 1 with tetra(4-ethynylphenyl)methane (2) in 98% yield. JH-CPP catalyzed the asymmetric Michael addition of aldehydes 4 to nitroalkenes 3 to give the corresponding adducts 5 in 67–99% yield with high stereoselectivity (10 examples).

Comment: For the formation of 5b, JH-CPP was recovered by centrifugation and reused four times without loss of stereoselectivity, while the yield of 5b decreased from the third reuse (1$^{st}$ reuse: 94% yield, 98% ee, dr = 92:8; 2$^{nd}$ reuse: 51% yield, 97% ee, dr = 91:9; 3$^{rd}$ reuse: 39% yield, 97% ee, dr = 88:12). JH-CPP was characterized by N$_2$ adsorption, TGA, XRD, SEM, and $^{13}$C CP/MAS NMR spectroscopy.