A Flow System for Enantioselective Carbonyl Ylide Cycloaddition

Significance: Polymer-supported chiral dirhodium(II) catalysts 1a–c were prepared and applied to the enantioselective carbonyl ylide cycloaddition under batch and flow conditions. Thus, the reaction of 2-diazo-3,6-diketo esters 2 with styrene (3) and phenylacetylene (5) was carried out with 1c to give the corresponding cycloadducts 4 and 6, respectively, in up to 80% yield and up to 99% ee.

Comment: The flow reactor packed with 1c (0.1 mol% Rh) and sea sand was used for the reaction of 2a and 3 to give 4 in 78% yield with 99% ee (leaching of Rh: 2.1 ppm; 0.013% of the initial catalyst charge). The flow reaction of 2b and 5 with 0.0067 mol% Rh of 1c afforded the cycloadduct 6 in 78% yield with 97% ee (TON = 11700, TOF = 780 h⁻¹).