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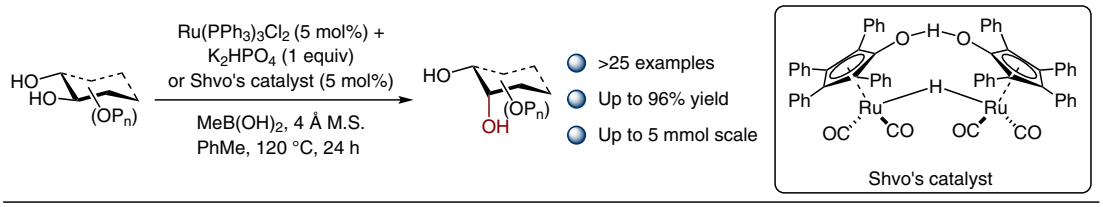
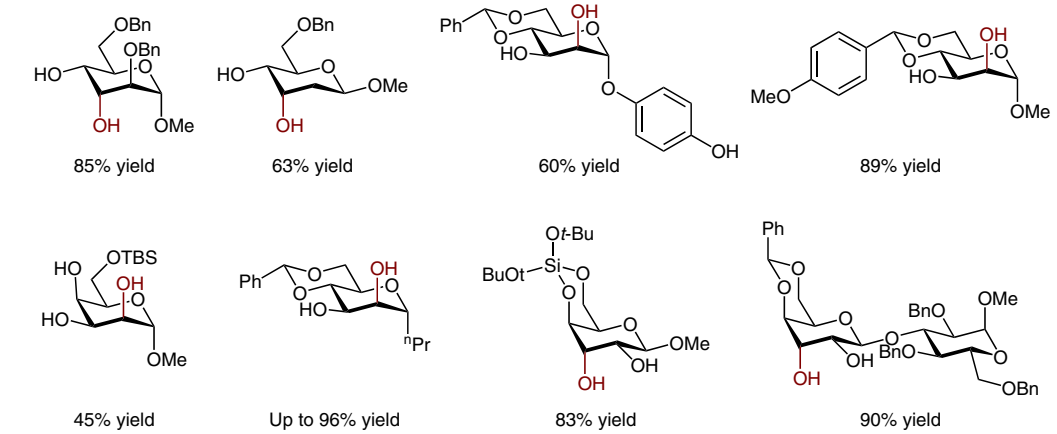
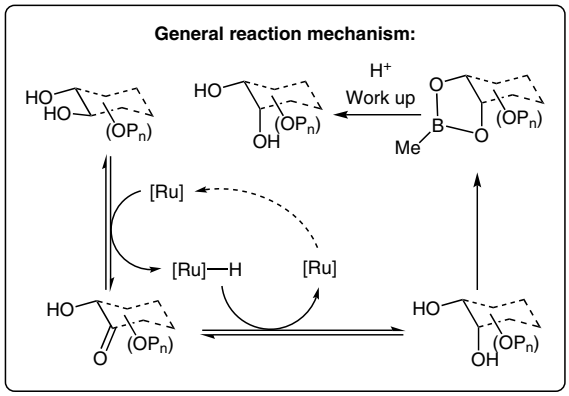
General Strategy for the Synthesis of Rare Sugars via Ru(II)-Catalyzed and Boron-Mediated Selective Epimerization of 1,2-trans-Diols to 1,2-cis-Diols
J. Am. Chem. Soc. **2022**, *144*, 3727–3736, DOI: 10.1021/jacs.1c13399.

General Strategy for the Synthesis of Rare Sugars via Ru(II)-Catalyzed and Boron-Mediated Selective Epimerization of 1,2-*trans*-Diols to 1,2-*cis*-Diols



Selected examples:





Significance: The Tang group reports a selective strategy for the conversion of sugars containing a *trans*-1,2-diol into the corresponding *cis* isomers. This method affords access to a wide host of rare sugars, with the OH group that flanks an axial OH group undergoing the epimerization each time. This approach was amenable to a variety of sugars, including complex disaccharides.

Comment: The formation of the boronate ester of the *cis*-1,2-diol drives the equilibrium toward the desired product. Shvo's catalyst was better for substrates containing an axial γ-substituent, while $Ru(PPh_3)_3Cl_2$ was superior for equatorial groups in the same γ-position. The authors propose this selectivity could be due to the difference in H-abstraction mechanisms for each catalyst.

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Synfacts 2022, 18(05), 0505 Published online: 20.04.2022
DOI: 10.1055/s-0041-1737428; **Reg-No.:** L03222SF

Category
Metals in Synthesis

Key words
ruthenium catalysis
boronic acid
sugars
epimerization
hydrogenation

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