

BASICS

Reactions are reversible

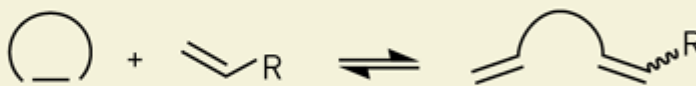
Cross-metathesis



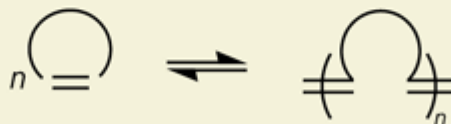
Ring-closing metathesis



Ring-opening metathesis



Ring-opening metathesis polymerization



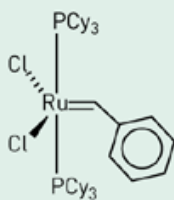
Acyclic diene metathesis polymerization



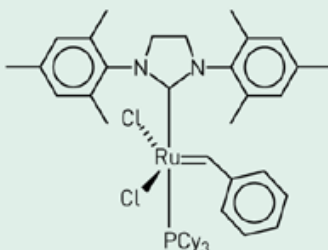
Different types of reactions involving **olefin metathesis**.

NO SWEAT

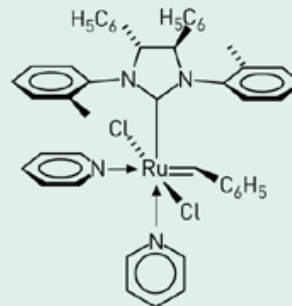
Metal carbenes have made reactions easy to run



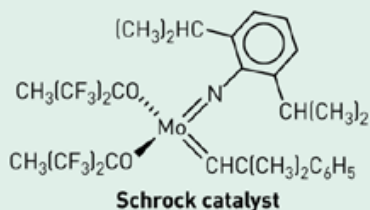
Grubbs catalyst



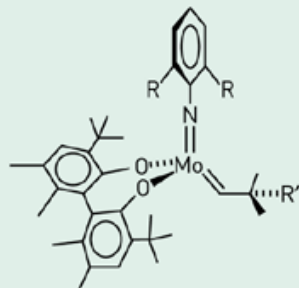
Grubbs second-generation catalyst



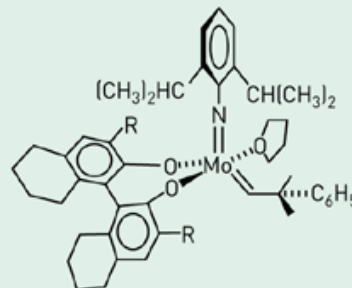
Grubbs chiral ruthenium catalyst



Schrock catalyst



Schrock-Hoveyda chiral molybdenum catalysts

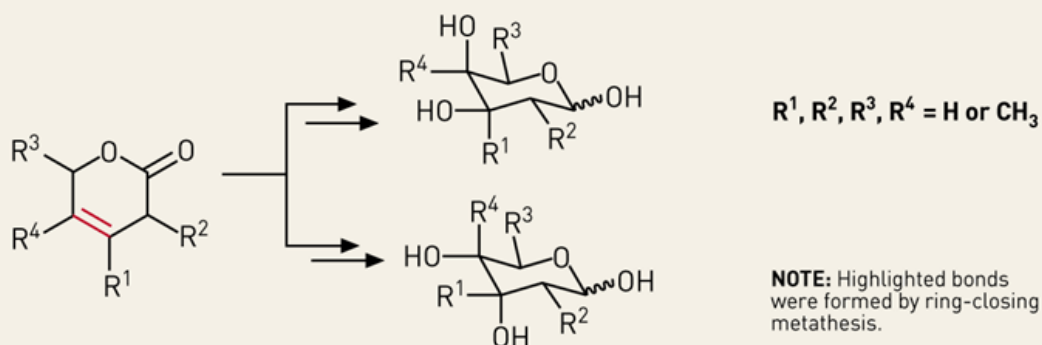


Cy = cyclohexyl

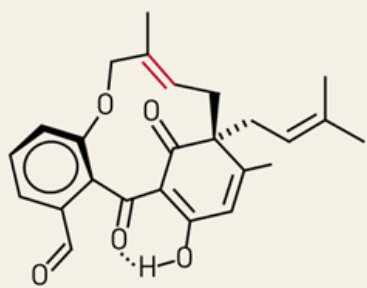
Some common **catalysts** used in olefin metathesis reactions.

RECENT FEATS

Ring-closing metathesis with ruthenium catalysts is key to the synthesis of complex compounds

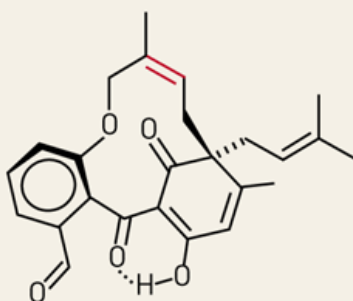


2,6-Dideoxy sugars
[*Org. Lett.* **4**, 3875 (2002)]



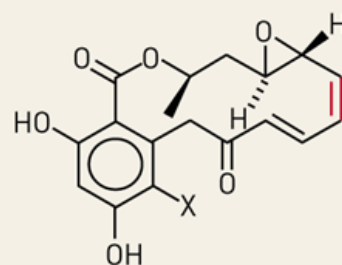
Coleophomone B

[*Angew. Chem. Int. Ed.* **41**, 3276 (2002)]

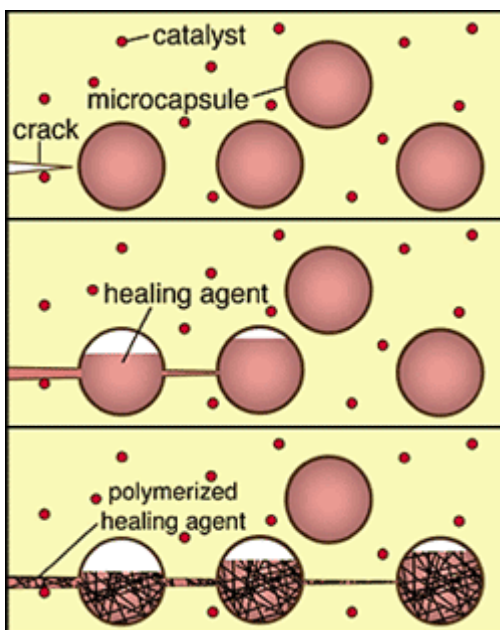


Coleophomone C

[*J. Am. Chem. Soc.*, **123**, 10903 (2001)]



Radicol (X = Cl)
Monocillin (X = H)



To achieve "**autonomic healing**," the material incorporates a microencapsulated healing agent (dicyclopentadiene) and Grubbs' catalyst.

As cracks develop, they rupture the embedded microcapsules.

Polymerization of the healing agent is triggered by contact with the embedded catalyst.

Smart materials: **self-healing** composites for spacecraft.