

**Table 2.15** Model for selectivity in CM, expanded to include cyclometallated Z-selective metathesis catalysts. Adapted with permission from Chatterjee, A. K.; Choi, T.-L.; Sanders, D. P.; Grubbs, R. H. *J. Am. Chem. Soc.* **2003**, *125*, 11360. © 2003 American Chemical Society.

Catalyst	Grubbs I	Grubbs II	Grubbs Z	
<b>Type I</b> (fast homodimerization)	<ul style="list-style-type: none"> <li>terminal olefins</li> <li>allyl silanes</li> <li>1° allylic alcohols</li> <li>1° allylic ethers</li> <li>1° allylic esters</li> <li>allyl boronates</li> <li>allyl halides</li> </ul>	<ul style="list-style-type: none"> <li>terminal olefins</li> <li>1° allylic alcohols</li> <li>1° allylic esters</li> <li>allyl boronates</li> <li>allyl halides</li> <li>styrenes (no large ortho sub.)</li> </ul>	<ul style="list-style-type: none"> <li>allyl phosphonates</li> <li>allyl silanes</li> <li>allyl phosphine oxides</li> <li>allyl sulfides</li> <li>protected allyl amines</li> </ul>	<ul style="list-style-type: none"> <li>terminal olefins</li> <li>allyl silanes</li> <li>1° allylic ethers</li> <li>allyl anilines</li> <li>allyl boronates</li> </ul>
<b>Type II</b> (slow homodimerization)	<ul style="list-style-type: none"> <li>styrene</li> <li>2° allylic alcohols</li> <li>vinyl dioxolanes</li> <li>vinyl boronates</li> <li>vinyl cyclopentane</li> </ul>	<ul style="list-style-type: none"> <li>styrenes (large ortho sub.)</li> <li>acrylates / acrylic acid</li> <li>acrylamides</li> <li>acrolein</li> <li>vinyl ketones</li> </ul>	<ul style="list-style-type: none"> <li>unprotected 3° allylic alcohols</li> <li>2° allylic alcohols</li> <li>vinyl epoxides</li> <li>perfluoro-alkane olefins</li> </ul>	<ul style="list-style-type: none"> <li>vinyl dioxolanes</li> <li>vinyl boronates</li> <li>vinyl epoxides</li> <li>vinyl cyclopentane</li> <li>protected 1° allyl amines</li> </ul>
<b>Type III</b> (no homodimerization)	<ul style="list-style-type: none"> <li>vinyl siloxanes</li> </ul>	<ul style="list-style-type: none"> <li>1,1-disub. olefins</li> <li>non-bulky trisub. olefins</li> <li>vinyl phosphonates</li> </ul>	<ul style="list-style-type: none"> <li>phenyl vinyl sulfone</li> <li>4° allylic C olefins</li> <li>protected 3° allylic amines</li> </ul>	
<b>Type IV</b> (spectators to CM)	<ul style="list-style-type: none"> <li>1,1-disub. olefins</li> <li>disub. <math>\alpha,\beta</math>-unsaturated carbonyls</li> <li>4° allylic C olefins</li> <li>perfluoro-alkane olefins</li> <li>protected 3° allylic amines</li> </ul>	<ul style="list-style-type: none"> <li>vinyl nitro olefins</li> <li>trisubstituted allyl alcohols, protected</li> </ul>		<ul style="list-style-type: none"> <li>1,1-disub. olefins</li> <li>4° allylic C olefins</li> </ul>

from B. L. Quigley, Caltech Thesis, 2016 (<https://thesis.library.caltech.edu/9846/>).