WINNERS of CHEMISTRY/PHYSICS NOBEL PRIZE

2016 Jean-Pierre Sauvage, Sir J. Fraser Stoddart and **Bernard L. Feringa**
"for the design and synthesis of molecular machines"

2010 Richard F. Heck, Ei-ichi Negishi and **Akira Suzuki**
"for palladium-catalyzed cross couplings in organic synthesis"

The Nobel Prize in Physics 2010: Andre Geim and Konstantin Novoselov
"for groundbreaking experiments regarding the two-dimensional material graphene"

2005: Yves Chauvin, Robert Grubbs e Richard Schrock
for the development of the metathesis method in organic synthesis.

2001: WILLIAM S. KNOWLES, and **RYOJI NOYORI**,
for their work on chirally catalysed hydrogenation reactions
K. BARRY SHARPLESS for his work on chirally catalysed oxidation reactions

2000: Alan J. Heeger, Alan G. MacDiarmid and Hideki Shirakawa
"for the discovery and development of conductive polymers"

1996: ROBERT F. CURL, Jr. , **SIR HAROLD W. KROTO** , and **RICHARD E. SMALLEY**
for their discovery of fullerenes

1987: DONALD J. CRAM , **JEAN-MARIE LEHN** and **CHARLES J. PEDERSEN**
for their development and use of molecules with structure-specific interactions of high selectivity

The Nobel Prize in Physics 1986: **Ernst Ruska** "for his fundamental work in electron optics, and for the design of the first electron microscope“
Gerd Binnig and Heinrich Rohrer "for their design of the scanning tunneling microscope"

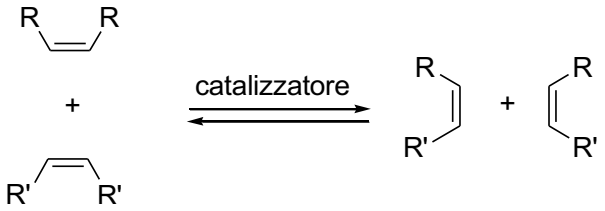
1981: KENICHI FUKUI and **ROALD HOFFMANN**
for their theories, developed independently, concerning the course of chemical reactions

1965: ROBERT BURNS WOODWARD for his outstanding achievements in the art of organic synthesis

1950: OTTO PAUL HERMANN DIELS and **KURT ALDER**
for their discovery and development of the diene synthesis

REAZIONE DI METATESI

Principio generale di metatesi di olefine sostituite in modo simmetrico.

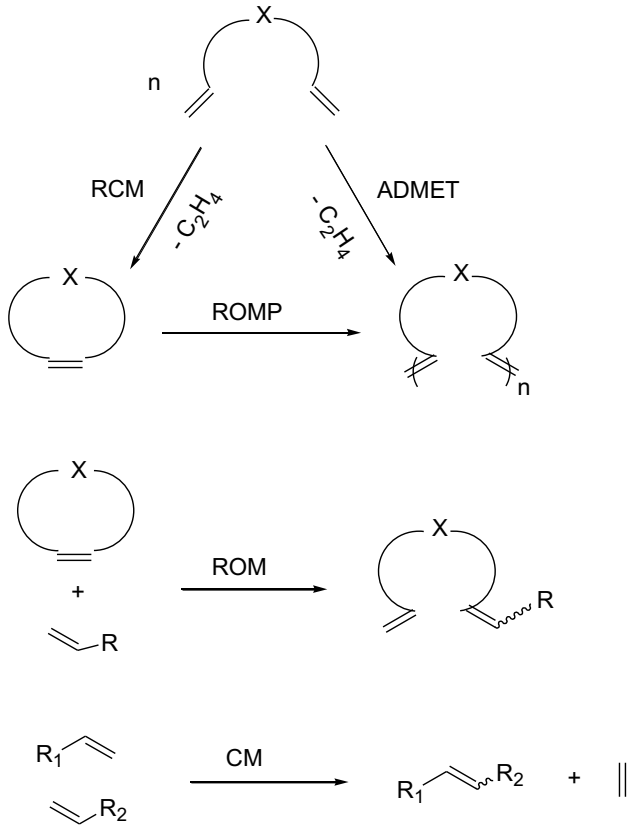


Yves Chauvin, Robert Grubbs e Richard Schrock

Nobel per la Chimica 2005

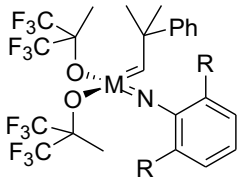
- K. C. Nicolau,.P. G. Bulger, D. Sarlah, Metathesis Reactions in Total Synthesis, *Angew. Chem. Int. Ed.*, 44, 4490-4527 (2005).
- F. Amblard, S. P. Nolan, L. A. Agrofoglio, Methatesis strategy in nucleoside chemistry, *Tetrahedron*, 61, 7067-7080 (2005).
- R. H. Grubbs, Olefin methatesis, *Tetrahedron*, 60, 7117-7140 (2004).
- A. Deiters, S. F. Martin, Synthesis of oxygen- and nitrogen-containing heterocycles by ring-closing methatesis, *Chem. Rev.*, 104, 2199-2238 (2004).
- A. D. Piscopio, J. E. Robinson, Recent applications of olefin methatesis to combinatorial chemistry, *Curr. Opin Chem. Biol.*, 8, 245-254 (2004).
- S. J. Connon, S. Blechert, Recent developments in olefin cross-methatesis, *Angew. Chem. Int. Ed.*, *42*, 1900-1923 (2003).

Diverse reazioni di metatesi di olefine

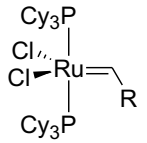


RCM = ring-closing methatesis
ROM = ring-opening methatesis
ROMP = ring-opening methatesis polymerization
ADMET = acyclic diene methatesis polymerization
CM = cross-methatesis

Alcuni catalizzatori e precatalizzatori usati nelle reazioni di metatesi

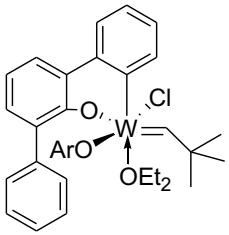


1 (M = Mo, W)



2

R = Ph, $CH{=}CPh_2$, ecc.



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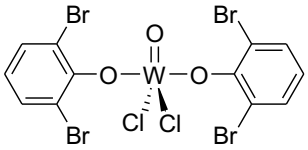
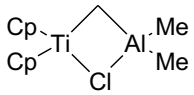


+ $PbEt_4$

4



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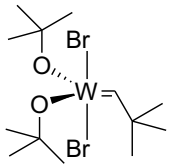
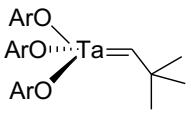


+ $GaBr_3$

6

$[MeReO_3]$ / Al_2O_3

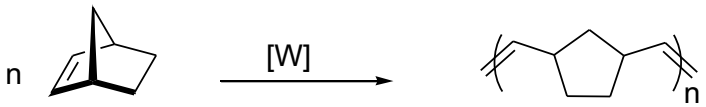
7



8 (Ar = 2,6-*i*$Pr_2C_6H_3$)

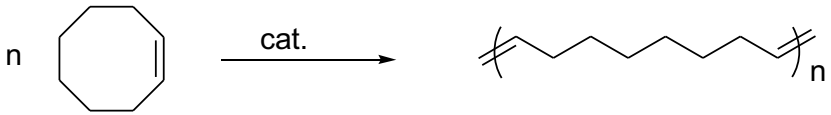
Reazione di metatesi applicata ad alcuni processi industriali

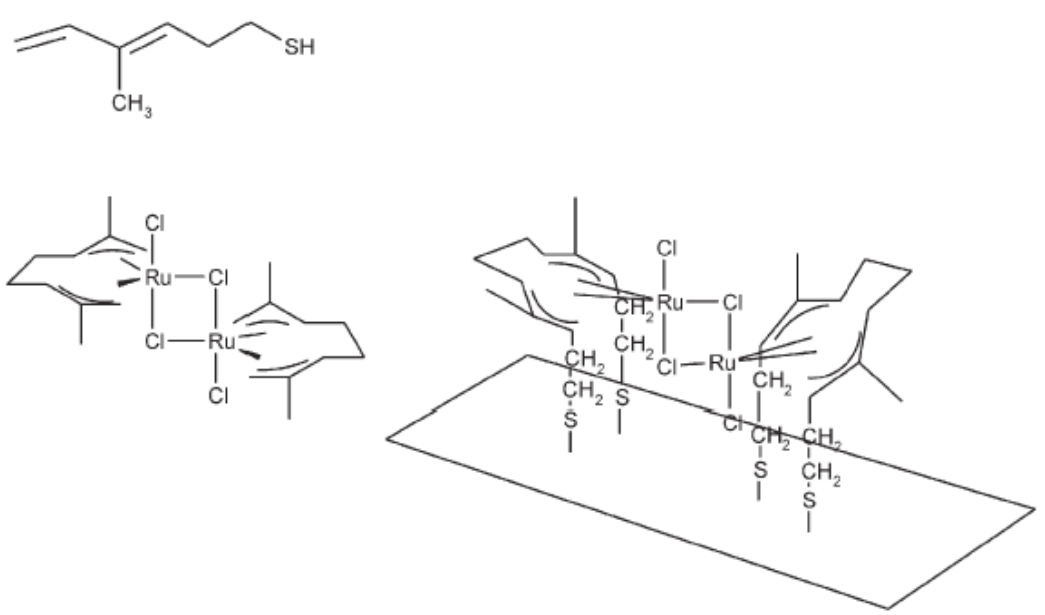
Processo Norsorex



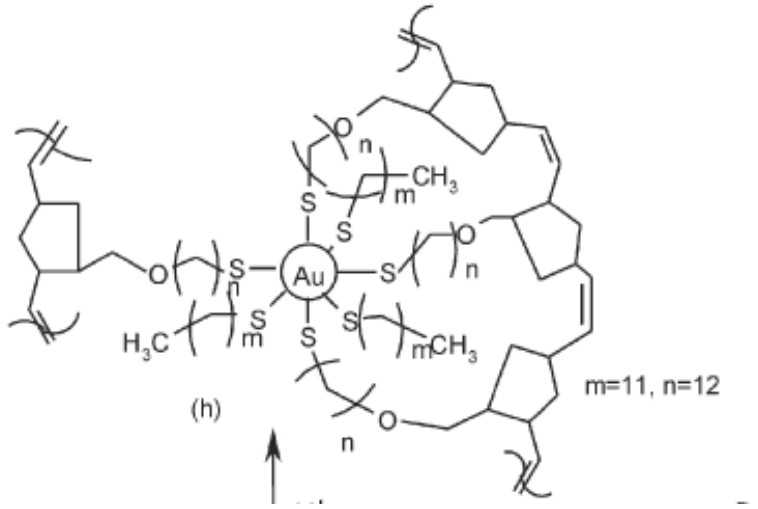
45.000 tonnellatate/anno

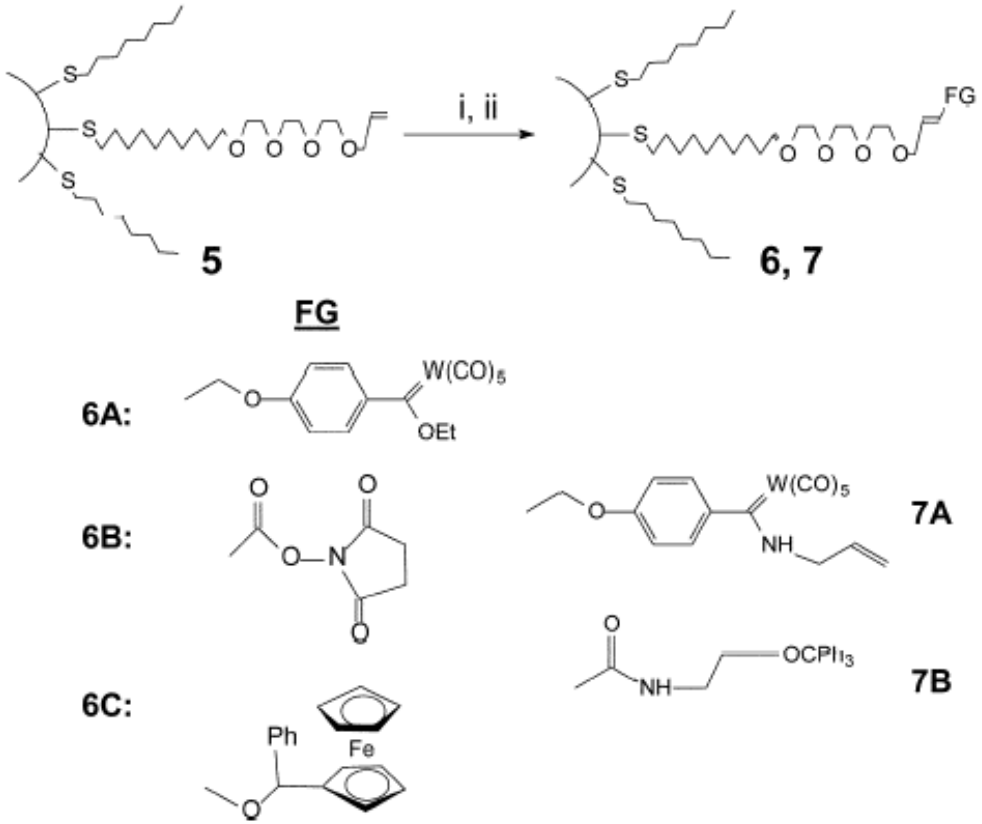
Processo Hüls-Vestenamer





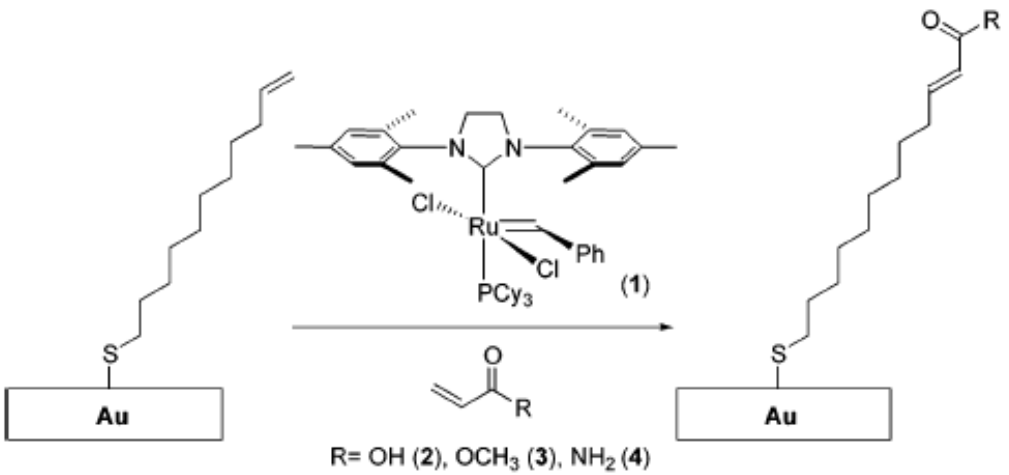
Scheme 19 A colloid-bound catalyst for olefin metathesis polymerization: the ligand used for colloid preparation, the homogeneous catalyst, and the surface-bound catalyst.[134]



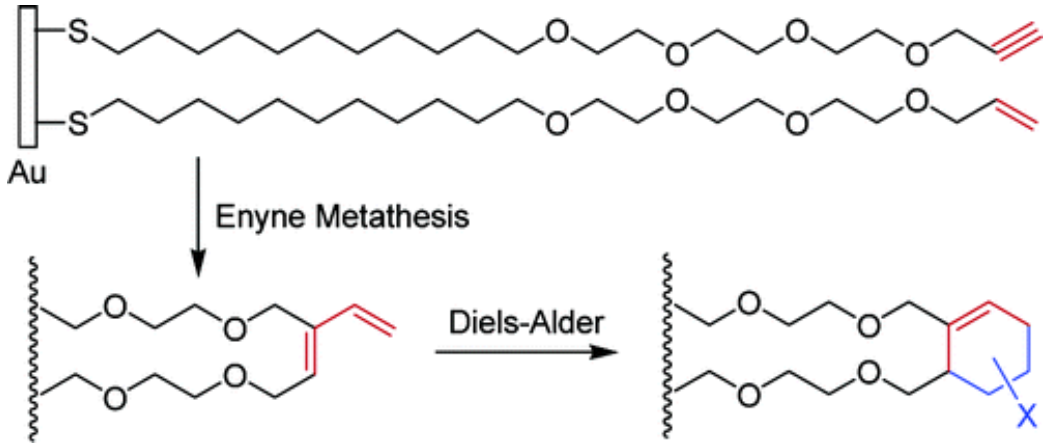


Scheme 2 Cross-metathesis reaction followed by aminolysis on gold colloids. *Reagents and conditions*: i, CH_2=CH–**FG1**, $Cl_2(Pcy_3)_2Ru$=CH–Ph (cat.), CH_2Cl_2, 12 h; ii, $\mathbf{RNH_2}$, CH_2Cl_2, 5 h.

Scheme 1. Schematic Description of the Procedure.

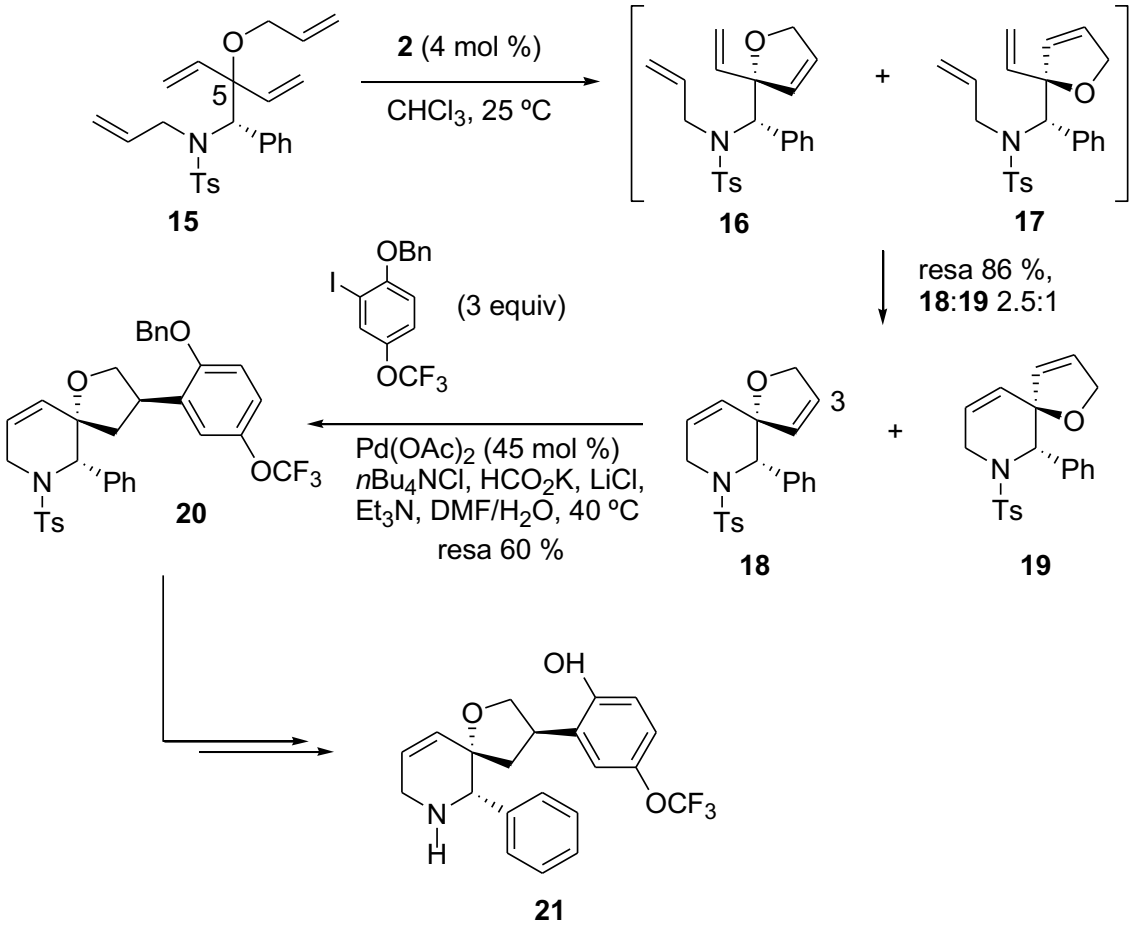


Langmuir **2003,** *19,* 8141-8143



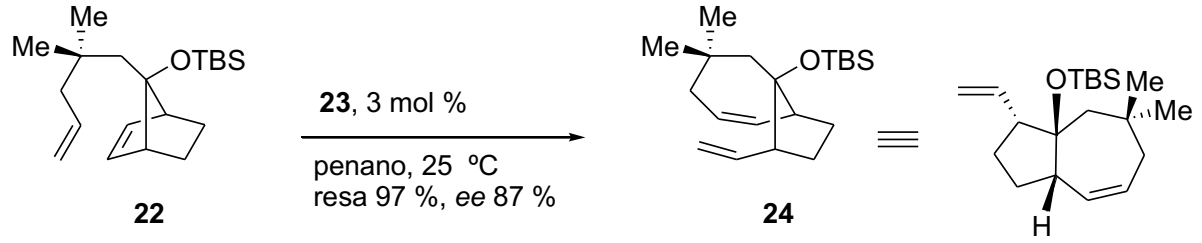
Langmuir **2005,** *21,* 10311-10315

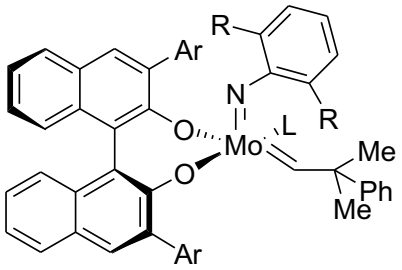
Sintesi dell'antagonista del recettore NK-1 via doppia RCM diastereoselettiva e reazione di Heck riduttiva (Merck)



antagonista del recettore NK-1

Reazioni di metatesi consecutive di chiusura e apertura di anello nella sintesi enantioselettiva del (+)-africanolo





23

R = *i*Pr, Ar = 2,4,6-*i*Pr$_3$C$_6$H$_2$, L = THF