



Olefin Metathesis catalysts by Umicore – from academia to industry

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ISOM17, 01.08.2007, Pasadena, USA

A world leader in non ferrous metals

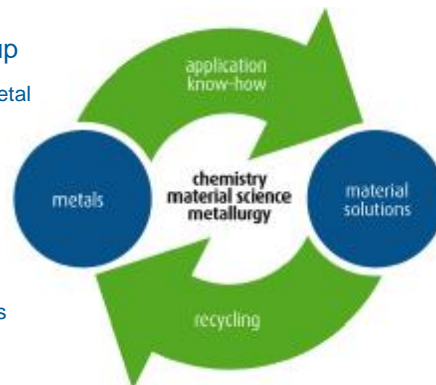
17,000 employees worldwide
11 bn US\$ turnover in 2006

A technology group

100 years history in metal processing

Metals

> 20 non Fe metals
strong focus on PGMs



Recycling

World's largest recycler of precious metals

Products

One of the two largest producers of PGM products

Precious Metals Chemistry



Converting Platinum Group Metals (PGM) into Chemicals

- § Standard and Advanced Inorganic Chemicals
- § Organometallic Chemicals & Catalysts
- § Customised Catalysts



Developing – Scaling up – Manufacturing

- § High Quality Precious Metal based Specialty Chemicals
- § Innovative Catalysts
- § Sophisticated Process Chemistry in Multipurpose Plants



Saving Value by recovering PGMs



To the Industry requests...



A transparent support

- § Dedicated catalyst portfolio
- § Availability from g to multi-kg scale
- § Customer oriented IP solutions
- § Process support
- § Secured access to metals



Our mission in metathesis



Customers

Cooperations

STREM

Application

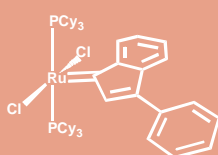
umicore

Realisation

Academia / Institutes

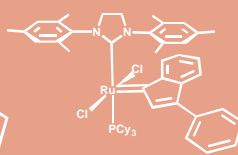
Invention

Neolyst M catalysts



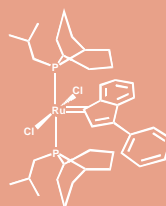
M1

Free



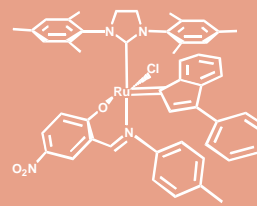
M2

Nolan



M3

Sasol



M4

Verpoort

§ Available at kg scale

§ Highly active, first, second and third generation catalysts

§ Proprietary customer catalysts in cooperation

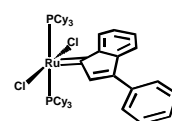
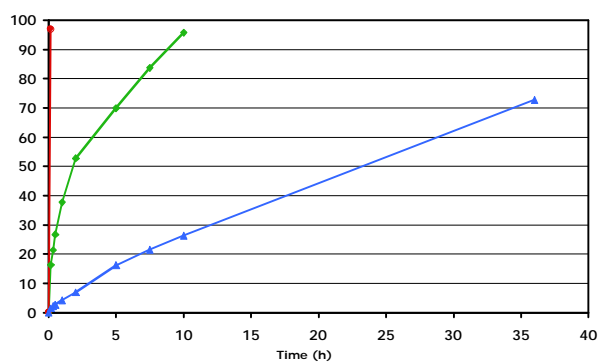
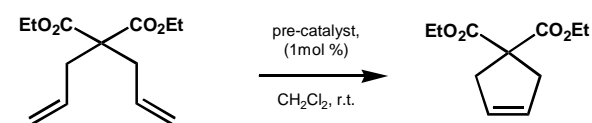
§ New boomerang catalysts in preparation

RCM with malonate substrates

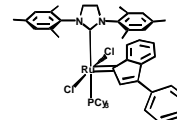
entry	cond.	Substrate	product	isolated yield (% h)			
				M1	U	M2	M3
1	a			98 0,25	64 5	95 5	96 2
2	a			89 6	59 5	99 5	89 2
3	b			<2 5	67 5	85 5	<2 5
4	a			100 0,25	-	100 5	100 2
5	a			93 1	-	91 8	46 7

a) 2 mol%, rt, CH₂Cl₂
b) 5 mol%, 80°C, toluene

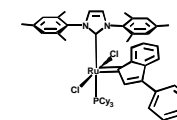
Kinetic studies with RCM of DEDAM



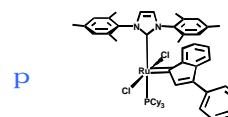
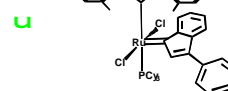
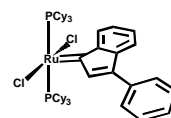
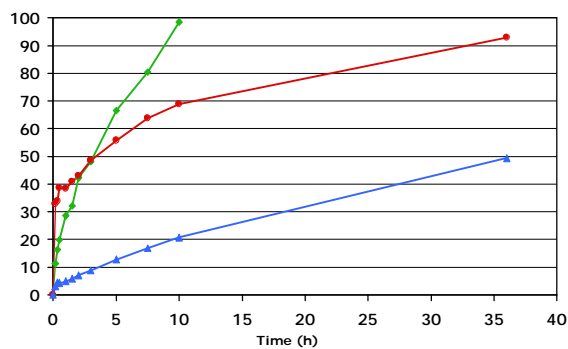
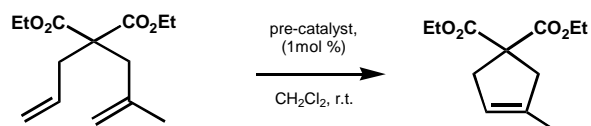
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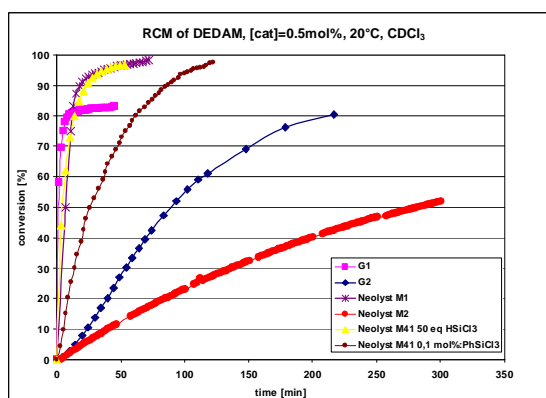
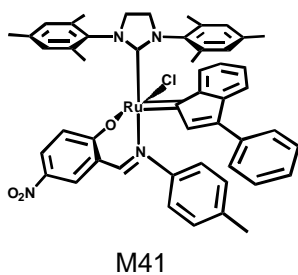
P



Kinetic studies with RCM of more hindered substrate



Kinetic studies with RCM of DEDAM



- § Very latent catalyst
- § Easy tunability
- § Thermal / chemical initiation
- § Selected systems for RCM and ROMP

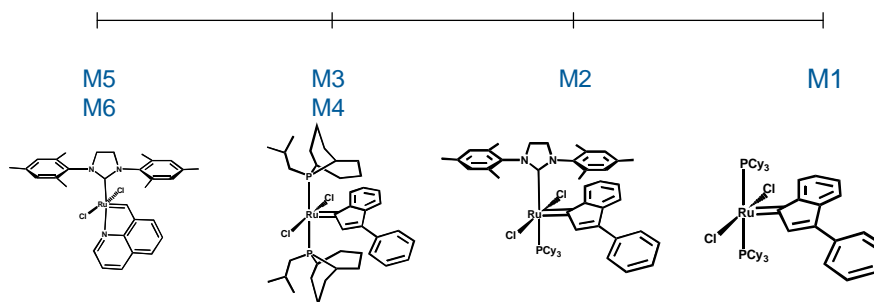
Catalyst development milestones

- IP
- Profiling

- Lab scale
- Beginning of marketing

Kg scale

Production



To summarize

Metathesis at Umicore

- § Dedicated catalyst portfolio
- § Industrial scale availability
- § Process implementation support
- § Secured Ruthenium metal access



Thank you for your
kind attention!

