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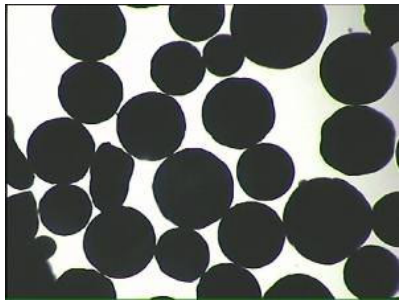
Pt(0) EnCat™



- Platinum salt encapsulated in polymer beads
- Subsequent activation step after bead synthesis
- Several different batches tested
- Investigated as selective catalyst for nitro reduction

Pt EnCat™ Benefits

- easily handled polymer beads
- simple removal by filtration
- good catalytic activity
- recyclability of catalyst beads
- chemoselective in hydrogenation reactions
- safer to handle than Pt/C
- reduced cleaning issues

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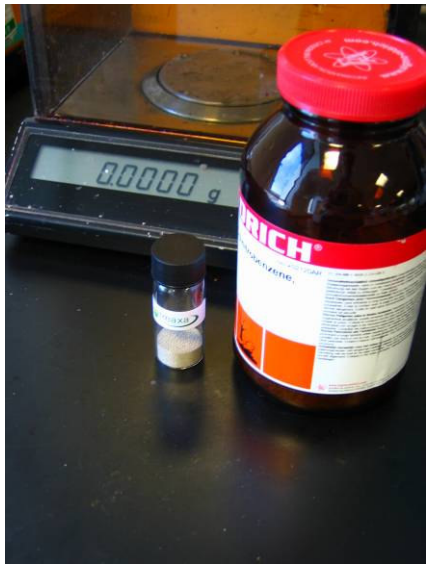
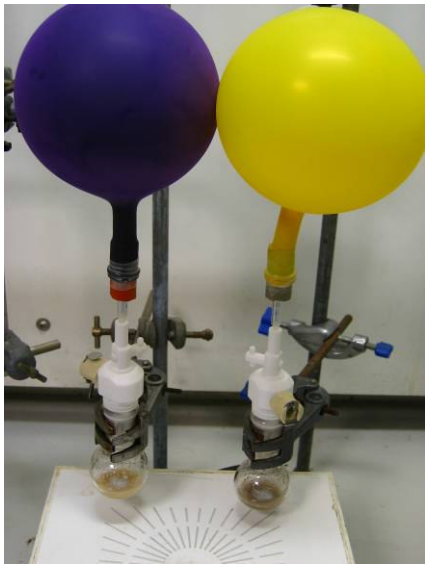
Pt EnCat™



Pt EnCat and substrate



Hydrogen balloon

GCMS Analysis

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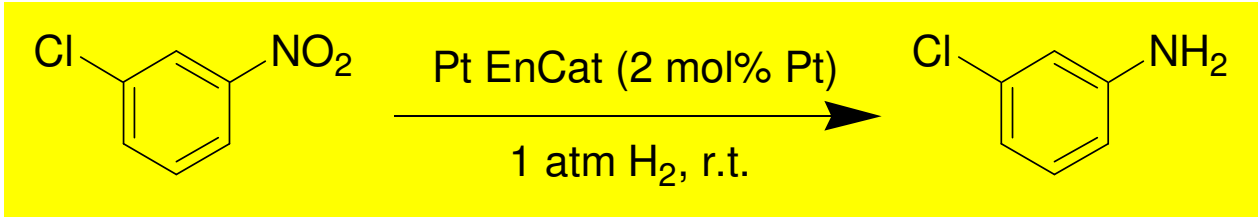
Solvent Choice



Solvent	*Time (h)*	*Conversion (%)*		
		Chloro aniline	*Aniline*	*By-products*
THF	5	81	3	16
EtOAc	24	85	1	14
MeOH	**5**	**89**	**4**	**7**
IMS	3	83	3	14

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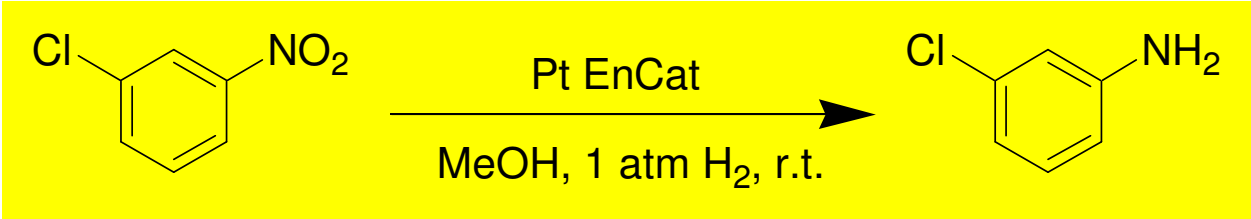
Catalyst Loading



Catalyst	*Time (h)*	*Conversion (%)*		
		Chloro aniline	*Aniline*	*By-products*
0.5 mol%	23	56	0	44
2 mol%	5	89	4	7
5 mol%	2	90	6	4
5 mol% (50% water wet)	2	91	5	4

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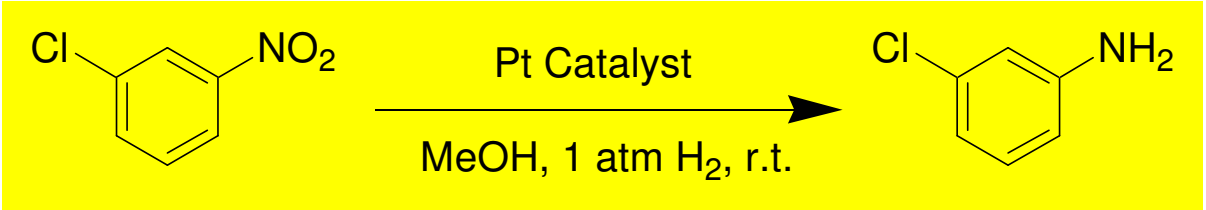
Pt EnCat™ vs Pt/Carbon



Catalyst	*Time (h)*	*Conversion (%)*		
		Chloro aniline	*Aniline*	*By-products*
Pt EnCat (2 mol% Pt)	5	89	4	7
Pt EnCat (5 mol% Pt)	2	90	6	4
5% Pd/C (1 mol% Pd)	3	8	76	16
5% Pt/C (1 mol% Pt)	3	80	7	13

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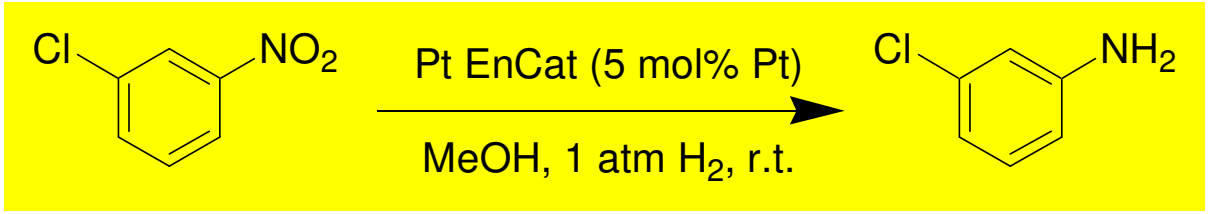
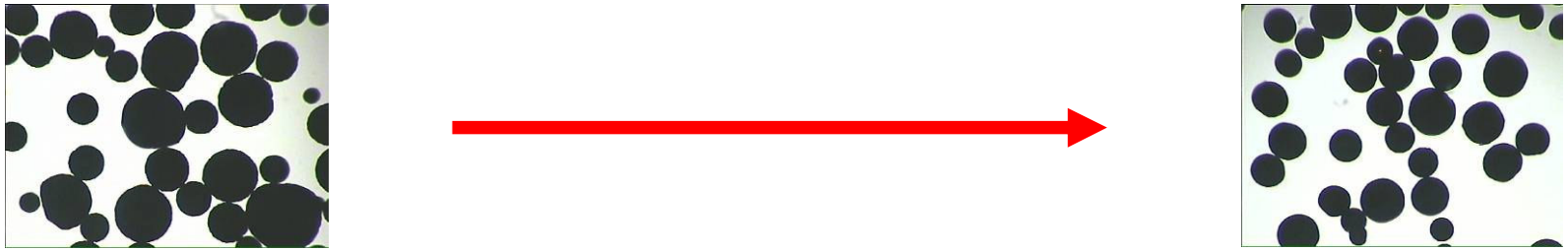
Catalyst Recycling





BEFORE **AFTER**

Run	1	2	3	4	5
Conversion (%)	100	100	100	100	100
Purity (%)	98	91	85	84	86
Time (h)	2	1.5	1.5	2.5	2

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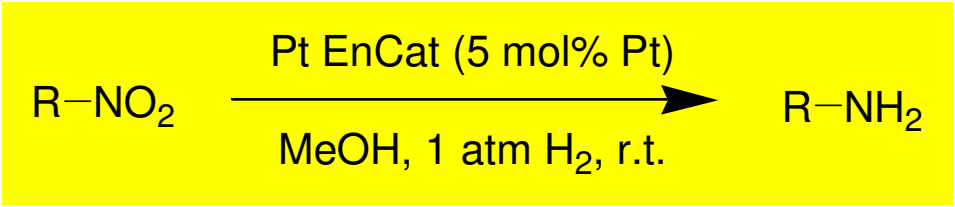
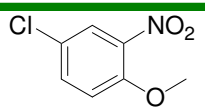
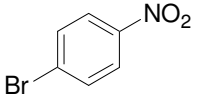
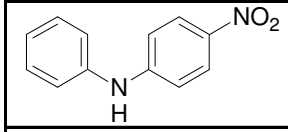
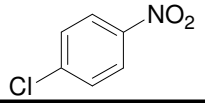
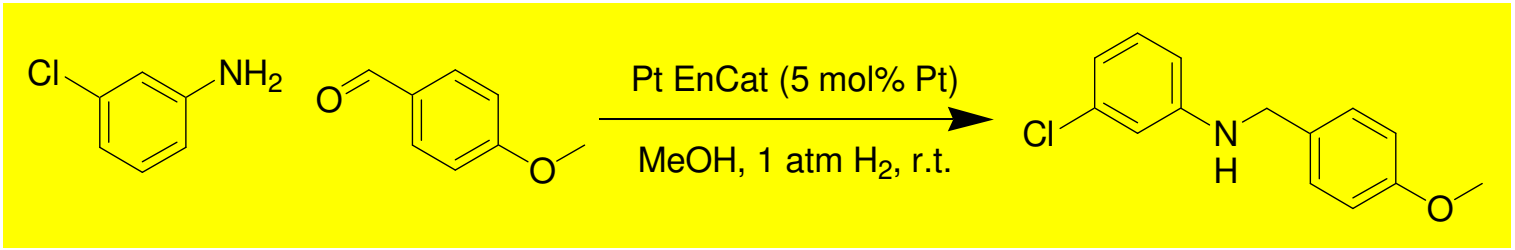
Different Substrates



Substrate	*Time (h)*	*Conversion (%)* *Product*	*De-halo*	*By-products*
	3	**98**	2	0
	5	**55**	34	11
	5	**97**	-	3
	3	**81**	13	5

Other Reactions

Reductive Amination



5 h, 70 %

Further examples under investigation

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Pt Leaching

Qualitative measure of leaching by removing catalyst mid reaction

Run reaction to approx 50% conversion → Pt EnCat removed by filtration → Filtrate returned to reaction conditions

Test for any additional conversion after removal of Pt EnCat

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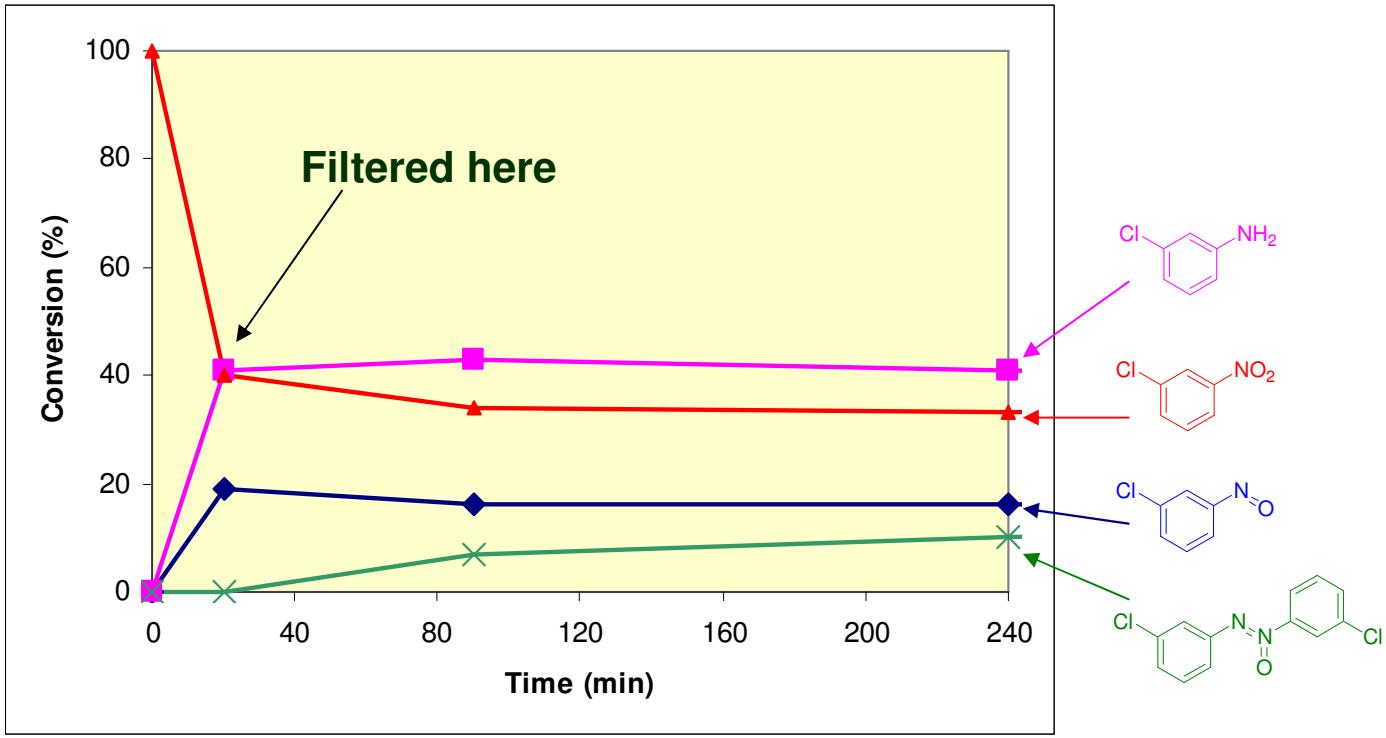
Pt Leaching



- No further reaction without catalyst
- Product and intermediate react over time

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Pyrophoricity

- Pt EnCat beads stirred in MeOH under H_2 for 2 h
- Filtered off, stood solvent wet on filter paper in air

No indication of flammability wet or dry

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