

Catalytic Reactions at Amine-Stabilized and Ligand-Free Platinum Nanoparticles Supported on Titania During Hydrogenation of Alkenes and Aldehydes

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Materials

Name	Company	Catalog Number	Comments
2-propanol	Sigma Aldrich	59300-2.5L	puriss. p. a., ACS reagent, >99.8%
4-methyl-2-pentanol	Carl Roth	4371.2	purity: >99%, for synthesis
5-methylfurfural	Sigma Aldrich	137316-100G	ReagentPlus, 99 %
acetone	Sigma Aldrich	32201-2,5L-M	puriss. p. a., ACS reagent, >99.5%
cannula	B Braun	4665643	diameter: 0.80 mm, length: 120 mm
CasaXPS	Casa Software		software, version 2.3.15
centrifuge	Heraeus		model: Multifuge 1s
centrifuge tube	Schott Duran	163-9315026	volume: 80 mL, diameter: 44 mm, length: 100 mm
chloroplatinic acid hexahydrate	Merck	8073400001	amount of platinum: 40 %
column	Agilent Technologies	19091 S-001	model: HP-PONA, film: dimethyl polysiloxane, film thickness: 0.2 µm, length: 50 m
CRYSTAL 17	CRYSTAL Theoretical Chemistry Group Torino		software, version: v1.0.2
crystallizing dish			volume: 50 mL
cyclohexene	Acros Organics	154840010	purity: 99 %
desposable syringe	Henke Sass Wolff		Norm-Ject, volume: 1, 2, 5 mL
didodecyldimethylammonium bromide	Acros Organics	407120250	purity: 99 %
diisopropyl ether	Carl Roth	T899.1	purity: 98%, for synthesis
dodecyl amine	Sigma Aldrich	D222208-500ML	purity: 98 %
double walled tank reactor	processed by glass blower		Standard ground glass joint sleeves: 2 x 14/23, 1 x 19/26, 1 x 29/32, reactor volume: 150 mL, material: quartz glas, with outer heating jacket
Fourier-transform infrared spectrometer	Bruker		model: Equinox 55

rubber balloon	Deutsch & Neumann	163-7652667	volume: 4 L, material: latex,
gaschromatograph	Agilent Technologies		model: 7820A
HP-PONA-column	Agilent Technologies	19091S-001	length: 50 m, film thickness: 0.5 µm, inner diameter: 0.2 mm
hydrogen	Air Liquide	P0231L50R2A001	purity: 5.0
ImageJ	Wayne Rasband		software, version 1.52
methanol	Sigma Aldrich	32213-2,5L-M	puriss. p. a., ACS reagent, >99.8%
n-hexane	VWR Chemicals	24577298	purity: 99 %
Opus	Bruker		software, version 5.5
pasteur pipette	Brand	747715	material: glass, length: 145 mm, inside diameter: 1 mm
pipette ball	Technikplaza	89005517	diameter: 94 mm, material: PVC
platinum(IV) chloride	Acros Organics	195400010	purity: 99 %
plunge operated pipette	LLG Lab Logistics Group	9.280 005	volume: 100-1000 µL
plunge operated pipette	LLG Lab Logistics Group	9.280 001	volume: 0.5-10 µL
potassium bromide	Carl Roth	9252.1	purity: >98%
reflux condenser	neoLab	LZ-1197	length: 160 mm, NS 14/23
rolled rim glass	VWR Chemicals	548-0625	volume: 10 mL
round neck flask	Carl Roth	HY50.1	volume: 10 mL, NS 14/23
rubber septum	Carl Roth	EE04.1	material: silicone, NS 14/23
syringe filter	Agilent Technologies	5190-5267	Captiva Econofilter, pore size 0.2 µm, PTFE membrane
syringe pump	Landgraf Laborsysteme HLL	106720180	model: LA180A
TEM grid	Plano		diameter: 3.05 mm, 300 mesh, covered with formvar and coal
temperature programmed oven	Nabertherm		model: L5, voltage: 230 V, power: 2.4 kW, controller: C6
tetrabutylammonium borohydride	Sigma Aldrich	230170-10G	purity: 98 %
three neck round bottom flask	Carl Roth	KY19.1	volume: 100 mL, NS 14/23, 14/23
Titania P25	Acros Organics	384292500	purity: 99 %
toluene	VWR Chemicals	32249-1L-M	puriss. p. a., ACS reagent, >99.7%
transition piece	Carl Roth		with core and stop cock, straight tubing olive, 29/32
transmission electron microscope	Zeiss		model: 900N
ultrasonic bath	Bandelin	305	model: RK 156, volume: 6 L
volumetric pipette	Brand	29718	volume: 50 mL
X-ray photoelectron spectrometer	Thermo Fisher		model: ESCALAB 250 xi