



## New Application Developments in PGMs – March 2009

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### Thermally stable platinum core-mesoporous silica shell nanocatalysts – Platinum

ACS, 02 March 2009

[http://portal.acs.org/portal/acs/corg/content?\\_nfpb=true&\\_pageLabel=PP\\_ARTICLEMAIN&no\\_de\\_id=840&content\\_id=WPCP\\_012113&use\\_sec=true&sec\\_url\\_var=region1&uuid=88862fc0-0287-48a5-bf4e-b2fdc54743a0](http://portal.acs.org/portal/acs/corg/content?_nfpb=true&_pageLabel=PP_ARTICLEMAIN&no_de_id=840&content_id=WPCP_012113&use_sec=true&sec_url_var=region1&uuid=88862fc0-0287-48a5-bf4e-b2fdc54743a0)

Thermally stable platinum core–mesoporous silica shell nanocatalysts can be used for high-temperature reactions. Colloidal nanoparticles show high catalytic activity and selectivity, but they often aggregate and deactivate easily. Organic capping agents, such as polymers and surfactants, can prevent the aggregation of nanoparticles in solution; but organic-agent-capped nanoparticles cannot be used in high-temperature catalytic reactions.

Nat. Mater. 2009, 8, 126–131; George Xiu Song Zhao

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### Double whammy for platinum cluster – Platinum

CHEMIE.DE, 03 March 2009

<http://www.chemie.de/news/e/97689/>

Scientists in Canada have determined the structure of a carbonatoplatinum(IV) complex that shows an unprecedented geometry

Original publication: Muhieddine S. Safa et. al., Chem. Commun. 2009.

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### Ketones from Aryl Halides and Aliphatic Aldehydes by Direct Acylation – Palladium

Scientific Update, 03 March

<http://www.scientificupdate.co.uk/publications/process>

The group of JianLiang Xiao at the University of Liverpool has recently published (Ruan J et al, J Am Chem Soc, 2008, 130, 10510-10511) the first report of a palladium catalysed method for a new acylation method, which promises to be very useful in process chemistry (see scheme). The reaction works for a variety of aldehydes, including some with additional ester functionality, and with a variety of aryl bromides, including those with F groups in the ring. The reaction works best in DMF; poor results were obtained in dioxane and toluene.

Hyder Z et al, ChemEur J, 2008, 14, 5555

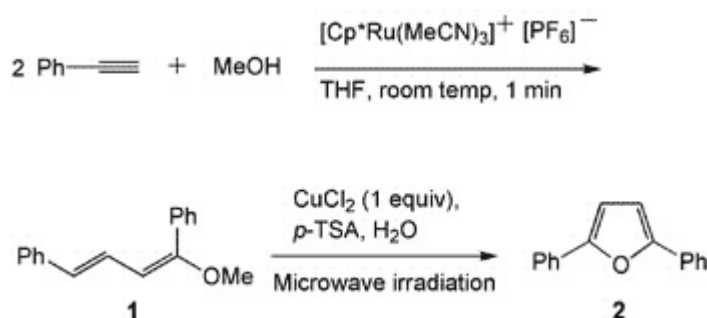
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**This furan synthesis uses successive metal-catalyzed processes: Ruthenium**  
Noteworthy Chemistry 09 March 2009

[http://portal.acs.org/portal/PublicWebSite/noteworthy/archive/WPCP\\_012163](http://portal.acs.org/portal/PublicWebSite/noteworthy/archive/WPCP_012163)

Functionalized furans are important components of bioactive molecules. M. Beller, P. H. Dixneuf, and coauthors at the University of Rennes (France), the South China University of Technology (Guangzhou), and the University of Rostock (Germany) describe a novel way to prepare 2,5-disubstituted furans directly from terminal aryl alkynes in one pot.

The synthesis begins with ruthenium catalysis to form an intermediate 1,3-dienyl ether (**1**) via a "click" dimerization of the terminal alkynes. This is followed by copper-catalyzed cyclization to the desired aryl-substituted furan ring (**2**). Cp\* is pentamethylcyclopentadienyl; *p*-TSA is *p*-toluenesulfonic acid.



W. Jerry Patterson

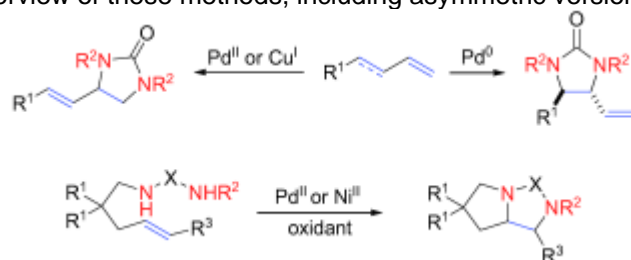
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**"Diaminations are a girl's best friend": Palladium**

Wiley InterScience, 10 March 2009

<http://dx.doi.org/10.1002/anie.200804362>

New reactions in the field of transition-metal-catalyzed diamination of olefins provide a powerful tool for the elaboration of more complex molecules bearing the 1,2-diamine moiety. An overview of these methods, including asymmetric versions, is given.



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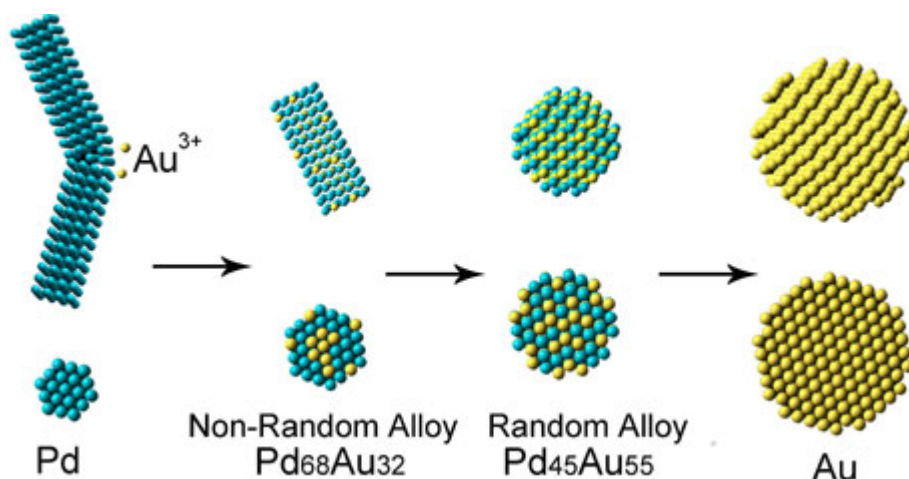
**A new nanocatalyst synthesis technique: Palladium**

Physorg.com, 16 March 2009

<http://www.physorg.com/news156446716.html>

Formation of Pd/Au nanostructures from Pd nanowires via galvanic replacement reaction.

Materials containing bimetallic nanoparticles are attractive in vast technological fields because of their unique catalytic, electronic, and magnetic properties. One of the most promising of the bunch is made from palladium and gold, an alloy that could be used in a wide variety of catalytic activities including the water-gas shift reaction and the oxidation of carbon dioxide - both important steps in alternative energy applications like fuel cells.



J. Am. Chem. Soc., 2008, 130 (3), pp 1093–1101

### Increasing Metal Catalytic Activities with Palladium

Azom.com, 18 March 2009

<http://www.azom.com/Details.asp?ArticleID=4639>

### Nanomaterial - Palladium (0.5% on Titanium Silicate, 50% Water-Wet Paste) Supplier Data by Strem Chemicals

NanoSelect LF Catalysts contain 0.5-0.6% of Palladium and are leadfree. Unimodal metal crystallite sizes of around 7 nm on the support provide similar activity and selectivity performance characteristics to conventional Lindlar Catalysts that contain 5 wt% Palladium and Lead. The lead additive is undesirable as it restricts manufacturing and use due to regulations and toxicity.

Stem Chemicals

### Asymmetric coupling in water: Palladium

Chemical & Engineering News, March 23 2009

<http://pubs.acs.org/subscribe/journals/cen/87/i12/html/8712scic4.html>

The Suzuki-Miyaura coupling is prized among synthetic chemists for its ability to form carbon-carbon bonds by joining aryl halides and aryl boronic acids. Now, chemists in Japan report an asymmetric version of this versatile reaction that can be done in water (*Angew. Chem. Int. Ed.*, DOI: 10.1002/anie.200900469). The key to the coupling, developed by Yasuhiro Uozumi and coworkers at [RIKEN](#), is a chiral imidazoindole phosphine-palladium catalyst that's linked to an amphiphilic polystyrene-poly (ethylene glycol) resin. Once the product is isolated from the catalyst-resin beads via extraction with supercritical carbon dioxide, this key catalyst-resin material can be recovered and reused several times without any detrimental effects on the coupling's catalytic activity or stereoselectivity. Uozumi also notes that the reaction tolerates a broad range of functional groups, including ethers, as in the example shown, as well as esters and nitrates. The resulting axially chiral biaryl products are achieved in good yields and up to 94% enantiomeric excess.

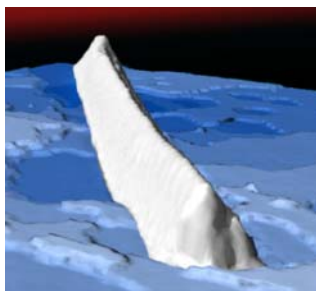
Science & Technology Concentrates, Volume 87, Number 12, p. 36

### **Metallic nanowires grow on insulators: Palladium**

nanotechweb.org, 26 March 2009

<http://nanotechweb.org/cws/article/tech/38409>

A group of UK researchers are the first to grow metallic nanowires on a dielectric substrate. The new work could prove crucial for making future nanoelectronic devices, such as high-density computing components, interconnects on nano circuit-boards or nanoscale electromechanical systems.



A 3D representation of a nanowire created from composite images. Credit: G Thornton.

Belle Dume

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### **Nanoparticles: image, target, treat: Platinum**

MedicalPhysicsWeb, 26 March 2009

<http://medicalphysicsweb.org/cws/article/research/38396>

Chemists at Brown University (Providence, RI), meanwhile, have come up with a means for delivering the cancer-fighting drug cisplatin directly to tumour cells in breast-cancer patients. The researchers created a dumbbell-like twin nanoparticle by attaching a gold nanoparticle to an iron-oxide nanoparticle. They then coupled a synthetic antibody (Herceptin) to the iron-oxide end and coupled cisplatin to a ligand attached to the gold nanoparticle.

Tami Freeman

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### **A good eye for oxygen: Platinum**

Innovations Report, 27 March 2009

[http://www.innovations-report.de/html/berichte/biowissenschaften\\_chemie/a\\_good\\_eye\\_oxygen\\_130077.html](http://www.innovations-report.de/html/berichte/biowissenschaften_chemie/a_good_eye_oxygen_130077.html)

Dye-doped nanoparticles very precisely indicate the oxygen concentration of cells and tissues. We cannot live without it; yet too much of it causes damage: oxygen is a critical component of many physiological and pathological processes in living cells.

Oxygen deficiency in tissues is thus related to tumor growth, retinal damage from diabetes, and rheumatoid arthritis. It is thus important to determine the oxygen content of cells and tissues, which is a challenge to scientists.

Jason McNeill, Clemson University (USA)

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**Electrophosphorescence device based on a porphyrin–platinum complex**

Noteworthy Chemistry, 30 March 2009

[http://portal.acs.org/portal/PublicWebSite/noteworthy/archive/WPCP\\_012394](http://portal.acs.org/portal/PublicWebSite/noteworthy/archive/WPCP_012394)

Efficient near-infrared polymer and organic light-emitting diodes based on electrophosphorescence from (tetraphenyltetranaphtho[2,3]porphyrin)platinum(II)

Efficiently emits in the near infrared. The development of organic light-emitting diodes (OLEDs) that luminesce in the long-wavelength region is desirable because of the OLEDs' potential use in telecommunications, IR signaling, and wound healing.

Ben Zhong Tang

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[www.platinummetalsreview.com](http://www.platinummetalsreview.com)