



New Application Developments in PGMs – November 2009

Here's a robust cyanation of aromatic halides: Palladium

Noteworthy Chemistry, 02 November 2009

http://portal.acs.org/portal/PublicWebSite/noteworthy/archive/CNBP_023283

Palladium-catalyzed cyanation of aromatic halides is often difficult because catalyst poisoning stalls the reaction. J. Wang and co-workers at Henan University of Science and Technology (Luoyang, China) found that adding 4.8 mol% of i-PrOH avoids this problem. They used ligand-free conditions with Pd(OAc)₂ as the catalyst and K₄Fe(CN)₆ as the cyanide source in N-methylpyrrolidone or DMF as solvent. The order of addition of the reagents is important when the reaction is scaled up: the best yields are obtained when K₄Fe(CN)₆ is added last.

How size matters for catalysts: Palladium

University of Utah News Release, 05 November 2009

<http://www.unews.utah.edu/p/?r=102909-1>

University of Utah chemists aimed a laser beam to vaporize palladium, creating electrically charged, palladium nanoparticles in a vapor carried by a stream of helium gas.

Electromagnetic fields are used to capture the particles and send them through a mass spectrometer, which selects only the sizes of palladium particles Anderson and colleagues want to study. The desired particles then are deposited on a single crystal of titanium oxide that measures less than a half-inch on a side.

Next, the chemists use various methods to characterize the sample of palladium catalyst particles: specifically the palladium catalyst's electronic properties, physical shape and chemical activity.

Rhodium catalysts give poly(phenylacetylene)s with high stereoregularities and molecular weights

Noteworthy Chemistry, 16 November 2009

http://portal.acs.org/portal/PublicWebSite/noteworthy/archive/CNBP_023484

M. V. Jiménez, J. J. Pérez-Torrente, and co-workers at the University of Zaragoza-C.S.I.C. (Spain) have developed a series of cationic rhodium complexes with hemilabile ligands that effectively catalyze the stereoregular polymerization of phenylacetylene.

The organorhodium catalysts have the general formula [Rh(diene){Ph₂P(CH₂)_nZ}]⁺[BF₄]⁻. The diene is 1,5-cyclooctadiene, tetrafluorobenzobarrelene, or 2,5-norbornadiene; n is 2 or 3; and Z is OMe, NMe₂, or SMe.

Here's a robust process for synthesizing a potential atherosclerosis drug: Palladium

Patent Watch, 16 November 2009

http://portal.acs.org/portal/PublicWebSite/patent/archive/CNBP_023483

deCODE genetics, Iceland

Materials Science Research Take Top Prize at Nation's Premier High School Science Competition: Platinum

PRNewswire, 21 November 2009

<http://www.prnewswire.com/news-releases/mathematics-and-materials-science-research-take-top-prize-at-nations-premier-high-school-science-competition-70732392.html>

Mathematics and Materials Science Research Take Top Prize at Nation's Premier High School Science Competition.

The Last of the 2009 Siemens Competition Regional Winners Announced at the California Institute of Technology? Will Compete for \$100,000 at National Finals.

Lynelle Ye Wins Top Individual Prize; Ryan Lindeborg and Andrew James Swoboda Win Top Team Prize.

Peptide mediation controls size and shape of platinum nanocrystals

Noteworthy Chemistry, 23 November 2009

http://portal.acs.org/portal/PublicWebSite/noteworthy/archive/CNBP_023522

Researchers at the University of California, Los Angeles, mediated the synthesis of ultrasmall (<5 nm) platinum nanocrystals (PtNCs) under mild conditions by using tailored peptides. Y. Li, G. P. Whyburn, and Y. Huang used a Thr-Leu-His-Val-Ser-Ser-Tyr (P7A) peptide sequence that was optimized for synthesizing water-soluble PtNCs at room temperature in aqueous solution.

The peptide coating on the nanocrystals can be removed by using photolysis degradation or by lowering the solution pH so that the particles can be used as catalysts.

Size and shape effects on the order–disorder phase transition in CoPt nanoparticles: Platinum

Nature Materials, 24 November 2009, 8, (12), 940-946

<http://dx.doi.org/10.1038/nmat2574>

Chemically ordered bimetallic nanoparticles are promising candidates for magnetic-storage applications. However, the use of sub-10 nm nanomagnets requires further study of possible size effects on their physical properties. Here, the effects of size and morphology on the order–disorder phase transition temperature of CoPt nanoparticles (TCNP) have been investigated experimentally, using transmission electron microscopy, and theoretically, with canonical Monte Carlo simulations.

One pot synthesis for nylon precursor: Palladium

Chemistry World, 26 November 2009

<http://www.rsc.org/chemistryworld/News/2009/November/26110902.asp>

A highly efficient route to cyclohexanone - a key chemical in the production of nylon - has been developed by researchers at the Beijing National Laboratory for Molecular Sciences, Institute of Chemistry, Chinese Academy of Sciences. The process uses a dual catalyst of palladium with a Lewis acid.

Taking the heat: Pitt team conquers hurdle to nano devices with first metallic nanoparticles resistant to extreme heat: Platinum, rhodium

University of Pittsburgh: News From Pitt, 30 November 2009

Just as a gecko sheds its tail, metal-alloy particles endure 850 degrees Celsius by ditching weaker components, researchers report in Nature Materials

<http://www.news.pitt.edu/m/FMPro?-db=ma&-lay=a&-format=d.html&id=3918&-Find>

Götz Vesper, an associate professor and CNG Faculty Fellow of chemical and petroleum engineering in the University of Pittsburgh's Swanson School of Engineering, and Anmin Cao, the paper's lead author and a postdoctoral researcher in Vesper's lab, created metal-alloy particles in the range of 4 nanometers that can withstand temperatures of more than 850 degrees Celsius, at least 250 degrees more than typical metallic nanoparticles. Forged from the catalytic metals platinum and rhodium, the highly reactive particles work by dumping their heat-susceptible components as temperatures rise, a quality Cao likened to a gecko shedding its tail in self-defense.

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