

# Hands on Chemistry Review



Issue 3, 2014

## Welcome to Hands on Chemistry Review

“Hands on Chemistry Review” is the newsletter of Digital Specialty Chemicals. DSC is a manufacturer of high quality organophosphorus and organometallic chemicals that are in demand in the global pharmaceutical, specialty chemical and semiconductor markets. DSC offers materials in kilogram to metric ton quantities. In each issue we bring you company news, employee biographies, new and developmental product information, technical reports and notice of upcoming events. Any questions or suggestions you have regarding the newsletter should be directed to Bill Stibbs on +1-(416)231-2991x113 or [marketing@digitalchem.ca](mailto:marketing@digitalchem.ca). To subscribe to the electronic newsletter please send your e-mail address to [marketing@digitalchem.ca](mailto:marketing@digitalchem.ca). Please also contact Bill to obtain access to previous issues of Hands on Chemistry Review. We would be happy to interact with you on a more frequent basis: please see the links to our social media sites at the end of the newsletter.

## Upcoming Tradeshows & Conferences

We will be exhibiting at ChemOutsourcing in Long Branch, New Jersey, 15-18<sup>th</sup> September (stand 75) and at CPHI Worldwide in Paris from 7-9<sup>th</sup> October.

## Announcement of Commercial Buchwald License

**DSC is pleased to announce that we have obtained a Commercial Patent License for Buchwald technology from the Massachusetts Institute of Technology (“M.I.T.”) and have expanded our Buchwald products portfolio to meet market demands.**

The technology invented by Dr. Stephen L. Buchwald, Professor of Chemistry, and his group at M.I.T is used in a broad range of palladium-catalyzed coupling reactions, including Heck, Suzuki, Buchwald-Hartwig, Sonogashira and  $\alpha$ -arylations. Over the last fifteen years, Buchwald’s group has developed several ligands to couple amines to aryl groups resulting in C-N bonds and also developed other metal-catalyzed syntheses to form C-C and other C-heteroatom bonds. Buchwald ligands are widely used to manufacture pharmaceuticals, fine chemicals and industrial products.

DSC has been granted an expanded, worldwide Commercial Patent License by M.I.T. for all applications. The license covers both composition of matter and the use of ligands and catalysts in metal-catalyzed processes. DSC’s

customers can move easily from R&D to commercial use of Buchwald technology without changing suppliers or obtaining a direct license with M.I.T. by executing a sub-license with DSC. The sub-license permits end users to use unlimited quantities of licensed Buchwald products to make or have made their own commercial products.

DSC has recently added several new products to the Buchwald technology portfolio. All ligands are manufactured using scalable processes developed and optimized by DSC’s R&D team. Several ligands are available from inventory for initial exploration work.

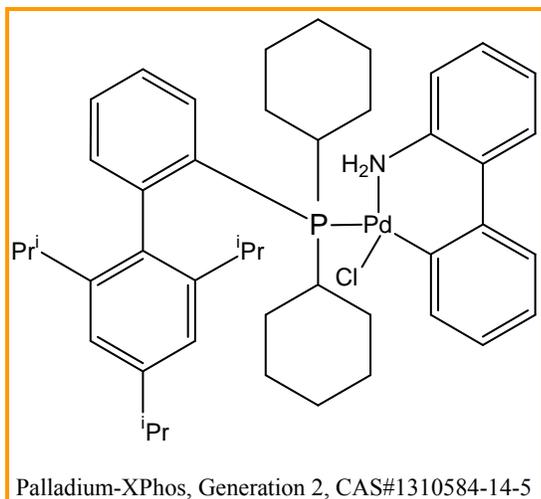
| CAS No.      | Product Name   |
|--------------|--|
| 224311-51-7  | 2-(Di-tert-butylphosphino)biphenyl   |
| 247940-06-3  | 2-(Dicyclohexylphosphino)biphenyl  |
| 255837-19-5  | 2-(Di-tert-butylphosphino)-2'-methylbiphenyl   |
| 240417-00-9  | 2-(Diphenylphosphino)-2'-(N,N-dimethylamino)biphenyl                                 |
| 224311-49-3  | 2-Di-tert-butylphosphino-2'-(N,N-dimethylamino)biphenyl                              |
| 251320-86-2  | 2-Dicyclohexylphosphino-2'-methylbiphenyl  |
| 564483-18-7  | 2-Dicyclohexylphosphino-2',4',6'-triisopropyl-1,1'-biphenyl                          |
| 657408-07-6  | 2-Dicyclohexylphosphino-2',6'-dimethoxy-1,1'-biphenyl                                |
| 564483-19-8  | 2-Di-tert-butylphosphino-2',4',6'-triisopropyl-1,1'-biphenyl                         |
| 857356-94-6  | 2-Di-tert-butylphosphino-3,4,5,6-tetramethyl-2',4',6'-tri- <i>i</i> -propylbiphenyl  |
| 1049726-96-6 | Sodium 2'-dicyclohexylphosphino-2,6-dimethoxy-1,1'-biphenyl-3-sulfonate hydrate      |
| 1160861-53-9 | 2-(Di-tert-butylphosphino)-3,6-dimethoxy-2',4',6'-triisopropyl-1,1'-biphenyl         |
| 1070663-78-3 | 2-(Dicyclohexylphosphino)-3,6-dimethoxy-2',4',6'-tri- <i>i</i> -propyl-1,1'-biphenyl |

DSC plans to expand the product line to include Buchwald pre-catalysts. The use of Buchwald pre-catalysts offers several advantages over Buchwald ligand use including higher yields, consistent reactivity profiles, higher end product purities, raw material and labor cost efficiencies and safer



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operations. DSC's first pre-catalyst is Palladium-XPhos, Generation 2, CAS#1310584-14-5. Product inquiries can be sent by email to [sales@digitalchem.com](mailto:sales@digitalchem.com) or by calling our headquarters at +1-416- 231-2991x120.



Please stay tuned via DSC's website, [www.digitalchem.com](http://www.digitalchem.com) and future additions of this newsletter for new announcements on the Buchwald technology portfolio. For our latest technical review on t-BuXPhos please follow the link below:

<http://www.digitalchem.com/HandsOnChemistryReview/Technical%20Review%20tBu-XPhos.pdf>

### Challenge the Team!

DSC has developed a reputation for developing, scaling-up and supplying new organophosphorus products and organometallic precursors for semiconductor, pharmaceutical and industrial chemical applications.

We are always eager to venture into new areas where we can apply the knowledge of organometallic chemistry developed in-house to successfully work on a wider variety of compounds. As a relatively small but agile organization with limited corporate bureaucracy, DSC is constantly scouting the market for new products that are in demand, even outside our current product portfolio.

We're always interested to hear from customers with a variety of needs: such as a requirement for a challenging target molecule, a product that requires a particular specialized synthetic capability, scale-up from R&D to commercial volumes, a reliable source for an ongoing project or would like to establish a second or third supplier for a strategic product.

DSC welcomes all inquiries and we usually reply within three working days as to whether the product in question is viable for DSC and often have a price quote available, provided there are not too many production steps involved and raw materials are freely available.

Challenge the DSC team by forwarding your inquiries to [marketing@digitalchem.ca](mailto:marketing@digitalchem.ca).

### Employee Biography: Zsolt Bencze, Regional Sales Director, Americas

Zsolt joined DSC in August 2014 and will focus on the company's sales and business development for the American continent outside Canada.

Zsolt had first joined DSC's sales team in January 2003, but in 2009 followed a call from his homeland and joined Ubichem, a CRO/CMO based in Budapest, Hungary to establish a subsidiary in the USA. After this adventure, he returned to DSC in August, 2014.

Zsolt graduated from Eötvös Loránd University in Budapest, Hungary with an MSc degree in organic chemistry. In graduate school, in Albuquerque, New Mexico he synthesized various oxacalixarene ligands and received his PhD in organic chemistry. Zsolt spent 4 years in the discovery and process development labs of Sanofi (Chinoin) in Hungary, synthesizing benzothiazines, isoquinolines and pyrazolopyrimidines. Eventually Zsolt left big pharma R&D to represent Sigma-Aldrich Fine Chemicals (SAFC) in East Europe for another 4 years. He then returned to the USA, to do an MBA at Webster University in Kansas City, just before he joined DSC.



### Quality Updates

July was a big month for our QC department.

Our 400MHz Bruker NMR came on-line: equipped with several automation features (auto-sampling, -tuning and -shimming) enabling higher sample throughput and improved consistency of analysis. The auto-tune feature allows us, for the first time in-house, to record spectra for some of the key elements of our organometallic products, such as <sup>29</sup>Si and <sup>59</sup>Co. The NMR probe can be heated above 200°C, improving our ability to analyze poorly soluble substances.

Concurrently with the installation of the new NMR, QC moved into a new 800ft<sup>2</sup> analytical laboratory, which provides generous bench space and improved infrastructure (air conditioning, better instrument ventilation, epoxy coated flooring and paints to minimize environmental contamination). In addition to the 400MHz NMR we are equipped with two GCs, a GC-MS, two HPLCs, one IC, an automated melting



point apparatus and KF analysis. And we have ample room for further expansion of our capabilities.

On July 21st we welcomed Abdelkrim Gherras to the QC team. Abdelkrim (aka Karim) has a Bachelors in Chemical Engineering and previously worked in the pharma industry at Patheon. We are actively looking to recruit a QC Manager, please send in your resume if you are interested to join our growing team.

### Water Conservation Project

DSC currently uses 'once flow through' potable water as a coolant source for our processing chillers and vacuum pumps. This practice is both expensive and environmentally unfriendly as large quantities of clean water (estimated 14 million gallons/year) are sent to sanitary sewer for treatment.

To address this situation, a 'closed loop' cooling water piping system (tied into a Berg chiller) has been installed to provide cooling to our processing chillers and pumps. During winter months, a glycol pre-cooler circuit (connected to roof-top condenser fans) will lead to significant electrical savings by pre-cooling water returning to the Berg chiller and thereby reducing refrigeration loads. This water recovery project will be commissioned in Q4, 2014 and is anticipated to reduce water consumption by 85%.

### What is This Beautiful Pure Product?



Congratulations to Ben Chen who correctly identified the mystery product in the June issue of Hands on Chemistry Review as pentakis(dimethylamido)tantalum, PDMAT.

### Community Involvement

During our Canada Day barbecue we took the picture below and submitted it to the Benefits Trust's ([www.thebenefitstrust.com](http://www.thebenefitstrust.com)) Canada Day photo contest. We did such a good job of showing off our Canadian spirit that we won the contest!



Some of our more creative employees (primarily the finance team) spent an evening honing their painting skills. They are pictured below with their masterpieces.



We held our annual company picnic in Milliken District Park, as you can see our employees and their families had a fabulous day out.



Our garden has been nominated for the 2014 Scarborough Trillium Garden Awards.



During our final barbecue of the summer some of the more intrepid members of our team took part in a frigid H<sub>2</sub>O challenge. As a result ~\$1,000 was raised for the Toronto SickKids Hospital ([www.sickkidsfoundation.com](http://www.sickkidsfoundation.com)).



### Pot Luck Lunch Recipe

The pot luck lunch (this is a lunch where all the participants bring one dish and everybody shares the food) is a regular part of our social program. Below is a recipe from Vasanti Baker, QA Assistant, Manufacturing Support, who took the prize for favourite dish at our July lunch. We hope you will not only try it, but enjoy it as much as we did!

### Teriyaki Pulled Pork

This can be very sweet and spicy and it is super easy to make. You can add more, less or different types of sauces.

**This is my version!**

### Ingredients

2 to 3 tablespoons of extra virgin olive oil (*for Chinese style use Peanut Oil*)

3 pounds of pork (shoulder is the best, loin is an alternative and *you can even substitute beef brisket or chicken*)

½ cup of teriyaki sauce (*kokkoman*)

1 cup of chicken or beef broth

3 tablespoons of brown sugar

4 gloves of garlic chopped (*I used 3 times more*)

1 full white onion

Sesame seeds

Black Pepper (*according to your taste*)

*Do not add any salt since the teriyaki sauce will give you all the salt flavour you want and more.*

### Directions

1. Heat the oil in a skillet (*medium to high heat*). Brown the pork on all sides for about 10 to 15 minutes. When the meat is ½ way browned, add the chopped onions and the garlic and brown it as well.

2. While the meat is being cooked, mix together the following in a bowl:

Teriyaki sauce

Broth

Brown Sugar

3. Put the browned meat in the slow cooker and cover it with the sauce mixture.

4. My slow cooker can cook fast for 4-6 hours or 8-10 hours very slow. **I chose 6 hours fast.**

### Additional Directions according to your taste buds.

1. I added some roasted sesame seeds with the teriyaki sauce mix. After the meat was cooked for 6 hours I added a little more and then I poured some sweet chilli sauce and brown sugar to make it a bit more sweet.

2. Just before serving, you can add some fresh sesame seed and cut some green onions and put it on the top.

3. Serve it with white rice and a salad.

Bona Appétit!

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