

# Your Dependable Chemistry Partner

*Customized Chemistry From Milligrams to Metric Tons*

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**[www.glsyntech.com](http://www.glsyntech.com)**

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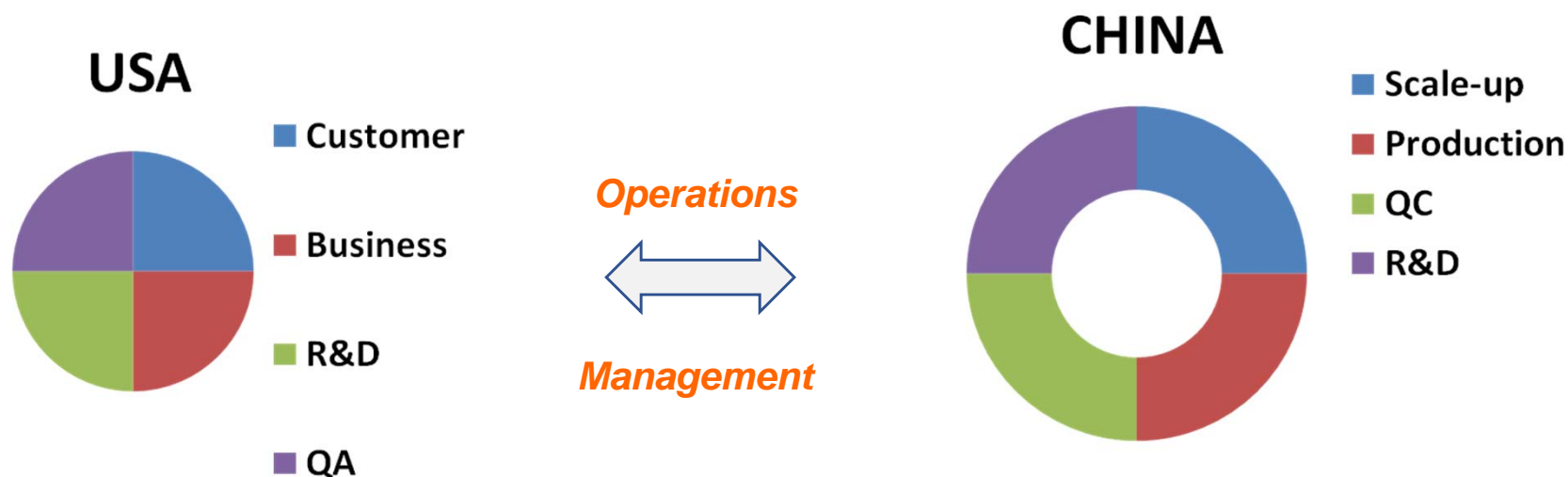
***A Member of BHW Tech Group***

# Overview

- A Privately held, USA-based, Technology Developer and Custom Manufacturer Nurturing New Drug/Product Discovery, Development, and Manufacturing
- Well Recognized by Clients in the Industry Globally, with 27+ Years of Extensive Experience in Chemistry Know-how, Custom Synthesis, Proprietary Processes, Custom Manufacturing, and Pharma Chemistry Services
- State-of-the-art R&D Centers in USA & China, and Efficient Manufacturing Plants in China, Enabling Reliable Manufacturing and Supply of Challenging Pharmaceuticals
- Inhouse Process Expertise in *Fluorinations, Hetero-cyclizations, Boronic Acids/Esters, Protected Amino Acids, Lab Reference Compounds, High-purity Omega-3 Products*
- Expanding Target Custom Products, Specialty Reagents, Biocatalyst Technology Platform, and Industrial Catalyst Chemistries
- Strategic Commercial Development of High-purity Omega-3 Products (GMP & non-GMP)
- 17+ Years of Competent Pharma Chemistry Services
- **BHW Tech Offering One-Stop Full-Spectrum Chemistry Solutions**

# Our Business Model

- Chemistry and Technology from Milligrams to Metric Tons
- Serving both **Pharmaceuticals/Biotech/Human Health/Life Science** and **Specialty & Agro Chemical Industries**
- A Privately Held USA Company with Manufacturing in China



- Direct to Market/Customer
- Direct to Regulation/Legislation/Liability
- Technology Leadership

- Cost Advantage/Rich Resource
- Scale of Economy Factor
- Growing China Market

# JV Group - BHW Tech Group



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- ❑ **A USA Company with Registration in Pennsylvania, USA**
- ❑ **Joint Venture (JV) Partners of BHW Tech Group**
  - *GLSyntech, LLC, Hatfield, PA 19440, USA, 27+ years*
  - *Jiangyin PharmaAdvance, Inc., Jiangsu Province, China, 18+ years*
  - *Shanghai Weiyuan Fine Fluorine S&D. Co., Ltd., Shanghai, China, 20+ years*
- ❑ **Formed in 2023 with a Global Technical Team of 190+ Chemists/Engineers**
- ❑ **Primary Industry/Business Focuses**
  - **Pharmaceutical and Biotech Industries**
  - **Human Health Industries**
  - **Specialty Chemical and Agro Chemical Industries**
- ❑ **“1 + 1 > 2” Synergy and Expansion from Individual Established Business**
- ❑ **Global Customers, Global Operations, and Global Practice Standard**

# Industry and Business Focus

- **Pharma/Biotech Industry Focused**

- Small Molecular Custom Synthesis (FFS and FTE)
- Custom Manufacturing
- Established Custom Products
- Inhouse Know-how Processes Enabling New API Development
- Unique Product Classes – Fluoro Aromatics, Fluoro Heterocyclics, Advanced Boric Acids/Esters, Heterocyclic Products, Protected Amino Acids, Reference Standards (API, impurities, and metabolites...),...

- **Pharma/Human Health Industry Focused**

- High-purity Omega-3 Products (EPA and DHA in EE form) for GMP Markets
- High-purity Omega-3 Products (EPA and DHA in EE form) for non-GMP Markets

- **Fluorination Technology and Applications**

- Broad Range of Custom Fluoro Products
- Specialty Fluorinating Reagents

- **Specialty Industry Focused**

- Catalyst Products (Imine Ligated NHC-Palladium Catalysts, Enzymes, and Ligands)
- Specialty Additives and Ingredients

*Custom Chemistry\_Process\_Manufacturing Driven*

# Business Credentials



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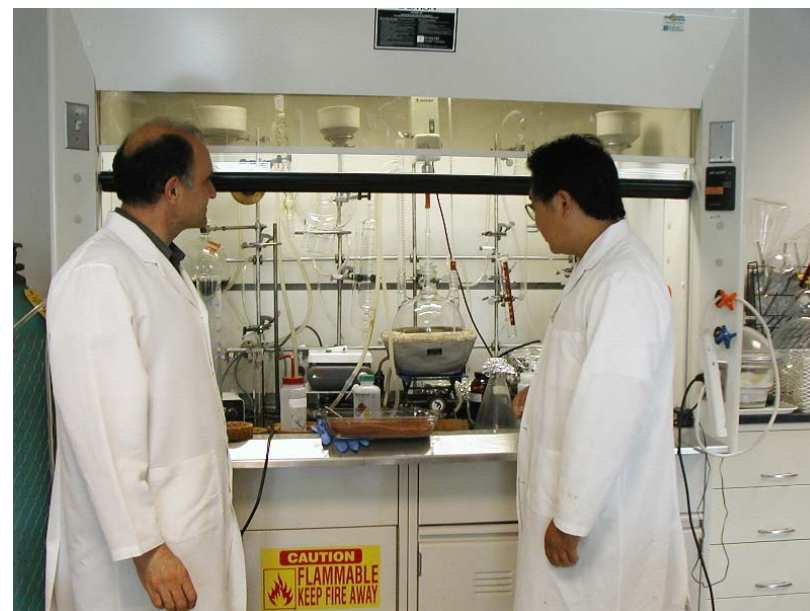
- A Combined 65+ Years in Custom Chemistry Solution Businesses
- A Key Supplier to Commercial API Productions for Two Top-10 Big Pharma Customers
- Qualified for Three Phase III Drug Intermediates for Top-10 Big Pharma Customers
- Qualified for a Recently Launched New Drug for a Top-10 Big Pharma
- Seven Intermediates Qualified for Phase II Developmental Drugs
- Successfully Marketed Four Specialty Chemical Products
- High-purity EPA98EE in Phase II-III Developments under GMP
- Executed Successfully Challenging Chemistry Service Projects (FTE/FFS) for 60+ US Pharma/Biotech/Institution Clients



# R&D Center in USA

**GLSYNTECH**  
Dependable Chemistry™

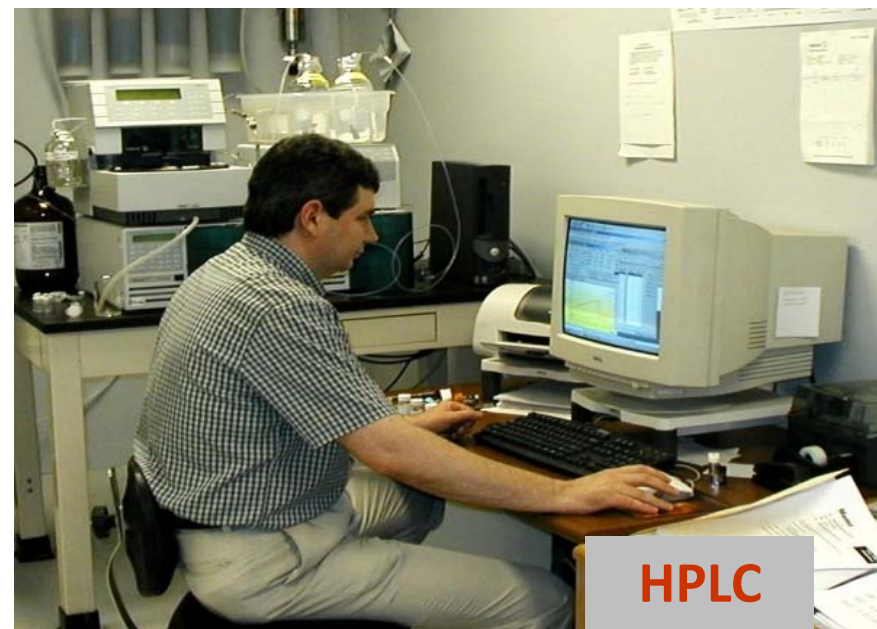
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- Focus on New Chemistry Development and Technology Leadership
- Mainly Serving Pharma/Biotech Industries
- Kilo Production and Biological Services
- Process Development and Tech Transfer
- Located in Worcester, MA

# Global QA

Advanced Instrumentation to Enable Quality



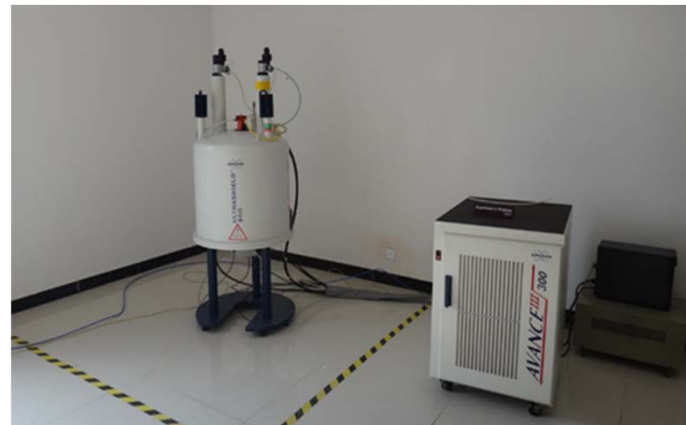


# R&D Operations in China

**GLSYNTECH**  
Dependable Chemistry™

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Cost Performance and Scale of Economy



# Logistics Center in China

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**GLSYNTECH**  
Dependable Chemistry™

天津安浩生物科技有限公司  
Tianjin Anhao PharmaTech Co.,Ltd.  
GL Syntech 中国分公司

- Location in Tianjin, China
- About 1300 FT<sup>2</sup> Lab Space, Expandable to 5000 FT<sup>2</sup>
- Primary Technical and Testing Lab
- Supply Chain and Supplier Management
- Administrative Operations in China



*Logistic and Technical Operations in China*



# Production Plants

**GLSYNTECH**  
Dependable Chemistry™

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# Production Plants

- Each Plant Focusing on Specific Chemistries and Processes
- Manufacturing of Pharmaceuticals and Specialty Chemicals
- Extra Production Capacity (~35%) Available for New Projects
- ISO Certified Production Sites
- All Plants Successfully Granted with ISO Certification
- cGMP Approach via Projects



**Jinzhou, Liaoning**

*Custom pharmaceuticals*  
*Fluor Aromatic Products*  
*Developmental Products*



**Shanggao, Jiangxi**

*Fluorinating Reagents*  
*Fluor Aliphatics*  
*Fluor intermediates*



**Quzhou, Zhejiang**

*Pharma Intermediates*  
*Specialty Products*  
*Developmental Products*

# Manufacturing Capacity



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## Kilo Production/Pilot Plants/Commercial Plants

### Equipment Capability

Total Reactor Capacity:	> 500,000 L
Number of Reactors:	226
7000 L, 2 sets	6000 L, 3 sets
5000 L, 6 sets	2000-3000 L, 20 sets
1000-1500 L, 30 sets	100-500 L, 33 sets
Temperature Control:	-78 to 300°C
Vacuum Capability:	up to 0.16 MPa
High Distillation and High-Pressure Capability	
Stainless Steel, Porcelain, Glass-lined	

### QC/QA Capability

16 QC Chemists  
NMR, GC, HPLC, LC-MS, Wet Chemistry and Analytical Lab  
Advanced QA Instrumentation in US R&D Center  
Material Approval and Release by QA



# Chiral Technologies

## Chemistry Technologies

> We are specialized in the following chem-transformation technologies

- Suzuki, Heck and Sonogashire Couplings
- Chiral Heterocyclic Transformations
- Protections of Amino Acids and their Derivatives (Fmoc-, Boc-)
- Liquid Phase Peptide Synthesis
- Freidel-Crafts Acylation and Alkylation
- Thiophosgenation and Phosgenation
- Fluorination, Bromination and Iodination
- Acetoacetylation and Acrylation
- Amidation and Amination
- Azidation, Carbonylation and Carboxylation
- Cyanomethylation and Cyclization
- Diketene and Ketene Reactions
- Epichlorohydrin Chemistry and Epoxidation
- Hydrazone Chemistry and Reactions
- Hydroformylation and Hydrosilylation
- Nitromethylation and Nitrosation
- Olefin Metathesis
- Optically Active Cyanohydrin
- Peroxidation and Silylations
- Sulfochlorination, Sulfonation and Sulfoxidation
- Thiocarbonylation and Tosylation
- Transamination and Transesterification

## Biocatalyst Technologies

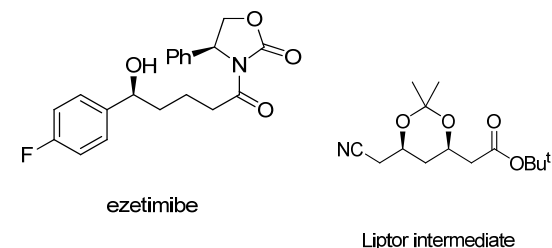
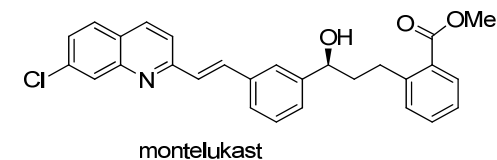
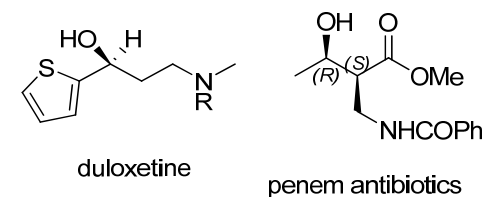
> Enzymatic Catalyst Products

- Ketoreductases
- Nitrilases
- Nitrile hydratases
- Ene reductases
- Oxynitrilases
- Transaminases
- Nitro reductases
- Alcohol oxidases
- P450s
- Amidases
- Epoxide hydrolases
- Lipases (immobilized)
- Proteases (immobilized)
- Esterases (immobilized)

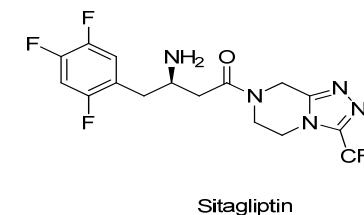
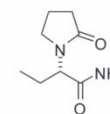
> Biocatalyst Services

- Biocatalyst libraries
- Lead screen Identification
- Process optimization
- Alternative process routes

> Alternative Processes Derived from Biocatalyst Transformation



Levetiracetam (Keppra®)



- **27+ Years of Good Chemistry Practice**

- Medicinal Chemistry and Custom Synthesis
- Process Development, and Contract R&D
- Kilo Scale GMP Service
- Custom Synthesis and Custom Manufacturing

- **Wide Range of Unique Custom Products**

- Fluoroaromatic/Fluoroheterocyclic Custom Intermediate Products
- Special Fluorinating Reagents
- Protected Amino Acids and Oligonucleotides
- Advanced Heterocyclic Compounds (N-, S- and O-based)
- Advanced Boronic Acids and Esters
- Lab Reference Compounds (APIs, metabolites, impurities,...)
- Unique Scaffolds and Intermediates

- **High-purity Omega-3 Products**

- High-pure GMP Products
- Broad range of EPA, DHA, and their Combos Products for non-GMP Markets

- **Novel Imine Ligated NHC-Palladium Catalysts**

- Highly efficient for cross-coupling of aryl chlorides and aryl boronic acids
- Excellent catalyst stability with diverse ligand adjustments
- Better catalytical economics with milder reaction conditions

# JV Synergy and Benefits

- ❑ **Great Benefits to Customers from Joint Venture (“1 + 1 > 2”)**
- ❑ **Expanding Chemistry Services and Enhanced Product Portfolio into New Clients and New Projects**
- ❑ **Technical Synergies Broadening Existing Product Portfolio with New Custom Chemistries and Processes**
- ❑ **Stronger Chemistry and Process Expertise Serving New Drug Pipelines from Drug Discovery, Development, to Manufacturing**
- ❑ **Transforming New Custom Chemistries and Custom Processes into Custom Manufacturing Projects**
- ❑ **Addition of 2000+ New Custom Products to Product Portfolio**
- ❑ **More Resources for Internal Development of New Custom Products/Processes, esp. for Bulk Quantity and High-value Drug-like Pharmaceutical Products**
- ❑ **Extending Continuously Building Block Compound (BBC) Portfolio**
- ❑ **One-Stop Custom Chemistry Solution Platform Fulfilling Chemistry Challenges in New Drug Discovery, Development, and Manufacturing Processes**

# Custom Chemistry Service (CCS)



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- Custom Chemistry Service Offering Competent Chemistry Services (FTE/FFS and Process Development) through a Strategic Joint Venture
- Well Recognized 17+ Yrs of Experience/Expertise with 160+ Dedicated Chemists and 60,000 sq. ft. of State-of-the-Art Chemistry Facility
- Executed Successfully Challenging Projects for 100+ Global Clients
- Industrial Credentials (Reference available upon request)
- Mastery of Project Management, IP management, and Customer Relationship
- 2500+ New Compounds added to Product Portfolio, with 25% in stock
- Know-how Custom Chemistries and Processes driving Process Development and Scale-up
- GMP Like Services
- One-stop Custom Chemistry Solution Platform Satisfying all Chemistry Needs in New Drug Discovery, Development, and Manufacturing Processes

***Success Track of Expertise and Experience***

# Profound Offerings in CCS

- **Medicinal Chemistry Services**
  - Hit to lead discovery
  - Lead Optimization
- **Customer Synthesis (from discovery to preclinical)**
  - Library templates, building blocks, libraries, intermediates
  - Literature and commercial reference compounds, metabolites
  - Milligram to multi-kilogram quantities
- **SFC Chiral Separation Services**
  - Separation of enantiomers
  - From milligrams to multi-grams scale
- **Contract Research for Chemical Process R&D**
  - Route selections and reaction optimizations
  - Scale-up synthesis of non-GMP APIs
  - Manufacturing advanced intermediates and regulatory starting materials
  - Impurity profiling and synthesis of impurities as reference compounds
- **Analytical Services:** supporting chemistry, method development, impurity profiling, etc.

*Drug Discovery → Preclinical Drug Development*



# Custom Fluoro Products

- 6500+ high-value fluoro-aromatic, fluoro-aliphatic and fluoro-heterocyclic products, along with other halogenated analogs
- 35% of Products in stock
- Production capacity in grams, kilos and tons
- Sustainable cost competitiveness & excellent quality
- Widely used in pharmaceuticals, agrochemicals and advanced materials

**Fluoro Heterocyclics** such as pyridines, pyrimidines, indoles, indazoles, pyrazines, ...

**Fluoro Aliphatic Compounds** such as 1-fluorocyclopropanecarboxylic acid and ethyl-2-fluoroacetoacetate

**Fluoro Aromatic Compounds** such as:

Acetophenones

Phenols & Anisoles

Benzamides

Benzoic acids/their esters

Benzonitriles

Benzyl alcohols & benzyl halides

Cinnamic aldehydes/Cinnamic acids

Hypnone (1-Phenyethanone)

Phenylisocyanates/phenyl isothiocyanates

Phthalic acids & anhydrides

Anilines

Benzaldehydes

Benzenes

Benzoyl chloride

Benzotrifluorides

Benzylamines

Hydroxybenzoates

Phenylacetonitriles/Phenylacetic acids

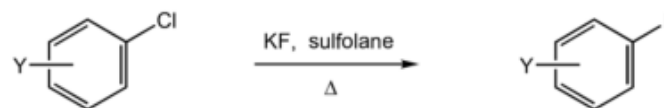
Phenylhydrazine series

Toluene series

**Full Spectrum Fluor Technologies and Products**

# Fluorinating Reagents

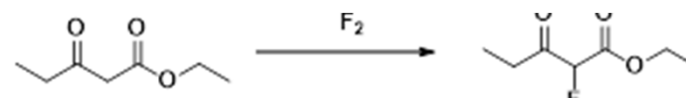
- Inorganic/ionic fluorides



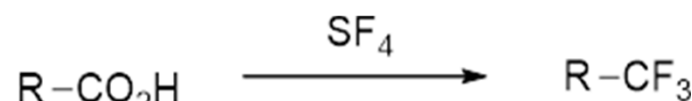
- SelectFluor® I and II



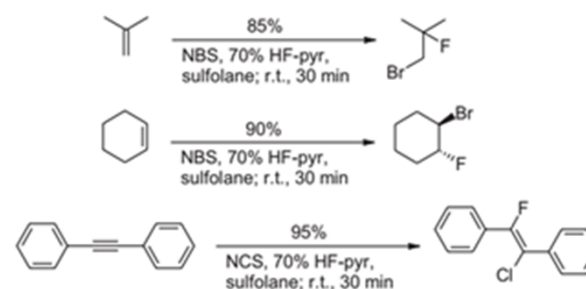
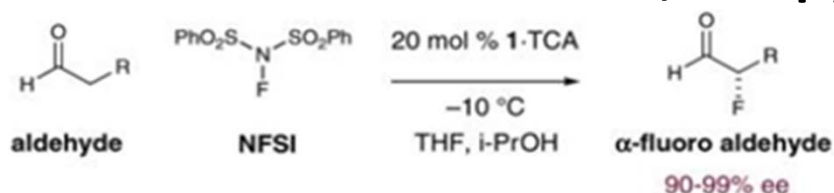
- Selective fluorination with fluorine gas (F<sub>2</sub>)



- Trifluoromethylation with SF<sub>4</sub>



- N-fluorobenzenesulfonimide, and pyridine HF/triethylamine tri-HF



*Sustainable Process Economics, Excellent Quality and Stable Supply*

# High-purity Omega-3 Products



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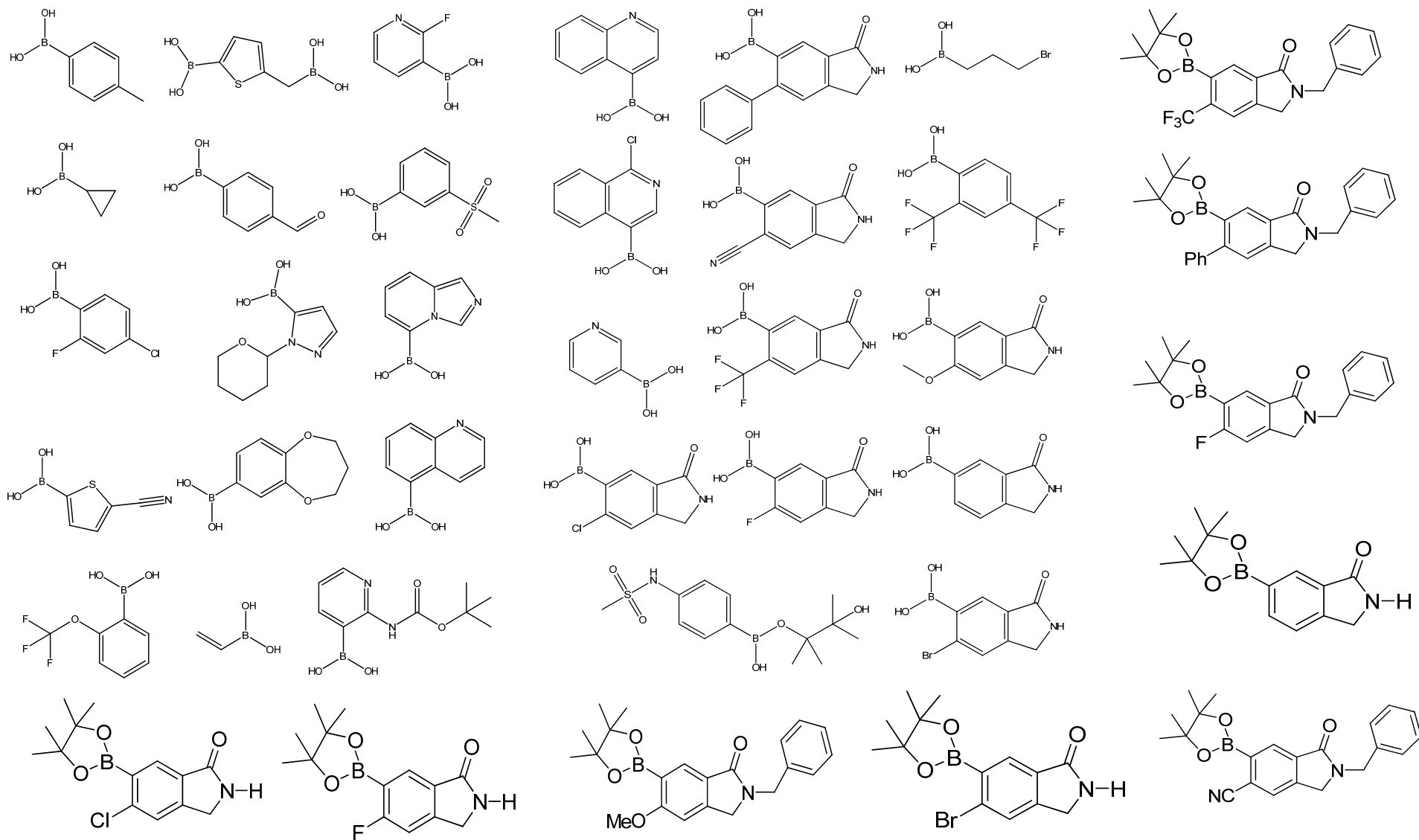
- **15 Years of Development with an Established GMP Manufacturing Facility Complying with cGMP, ISO9001, ISO14001, ISO 10012, and ISO22000**
- **Manufacturing Capacity 650 MT/year of High-purity EPA and DHA Products**
- **Serving both GMP and non-GMP Markets**
- **Key Product Offerings**
  - A high purity Omega-3 EPA in ethyl ester (EE) form, EPA98EE, in its clinical Phase II/III development
  - Several high purity Omega-3 EPAs and DHAs in EE forms in early phase clinical developments
  - A broad range of EPA, DHA, and their combo products in EE form used in nutritional supplements, foods, and beverages markets
  - Omega-3 Acid Ethyl Ester 90 (offset to Lovaza®)
  - DHA-free, high purity Omega-3 EPA products in EE form with EPA concentration from 70% to 99% (include offsets to Vascepa® and Epadel®)
  - High purity Omega-3 DHA products in EE form with DHA concentration from 70% to 97%
  - EPA-free, high purity Omega-3 DHA API in EE form, DHA95EE
  - Mixed EPA and DHA in various ratios of total EPA+DHA from 70% to 95%
  - Various EPA and DHA grades in EE form such as EPA80EE, EPA90EE, EPA98EE, DHA80EE, DHA90EE and DHA95EE
  - Omega-3 EPA and DHA products, in the acid form, such as EPA90A, EPA95A, DHA90A and DHA95A
  - Custom Omega-3 EPAs, DHAs, and EPA/DHA combos

*Strategic New Product Developments*

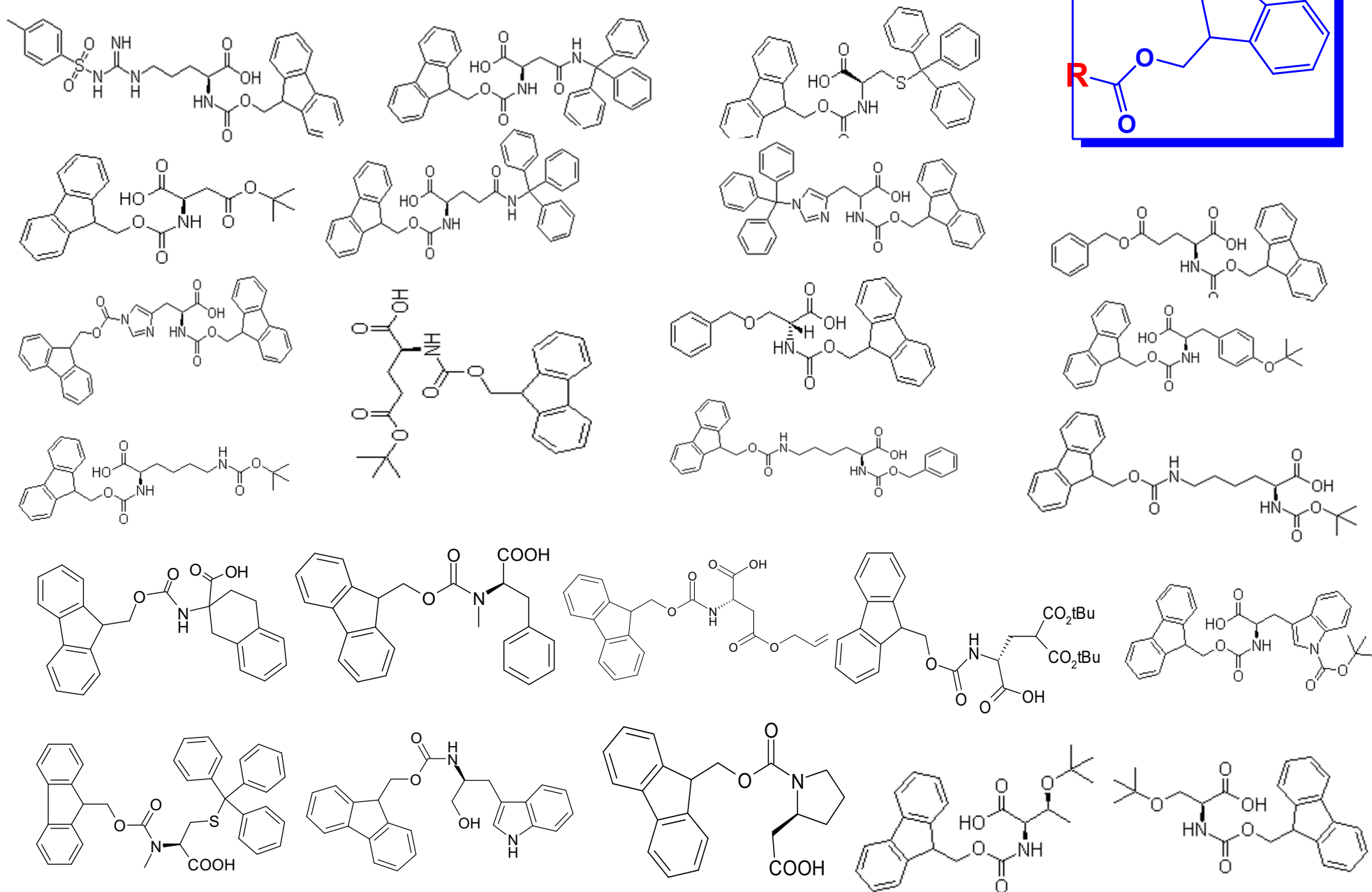
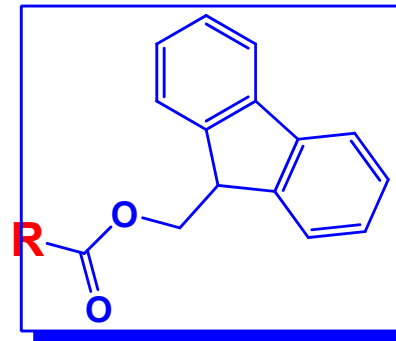
# Specialty Boronic Acids/Esters

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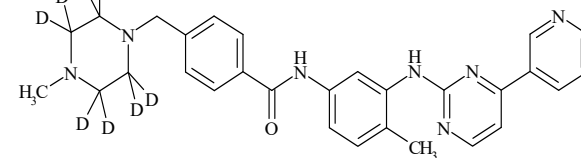
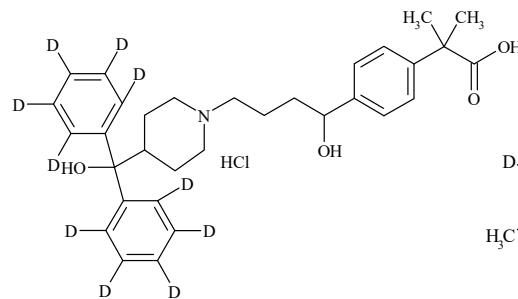
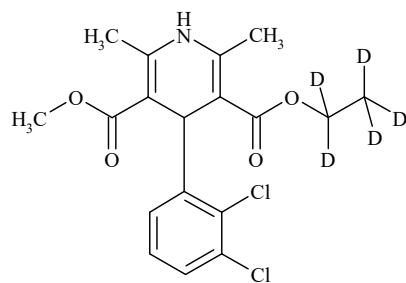
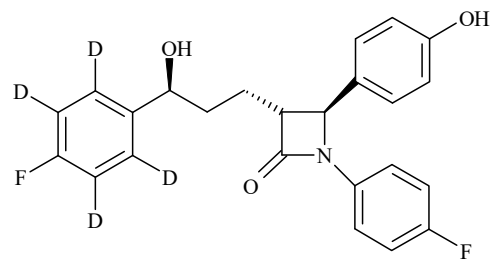
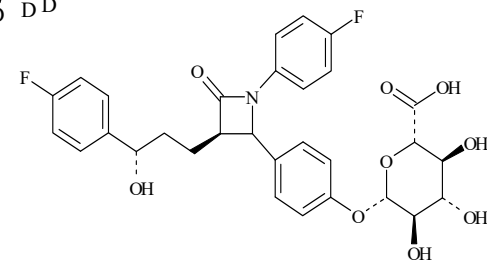
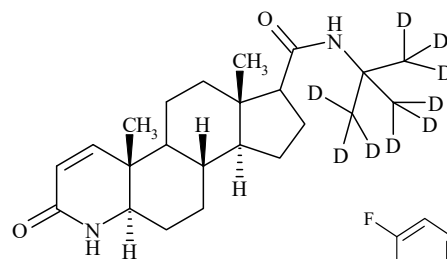
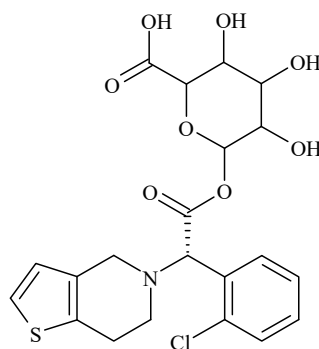
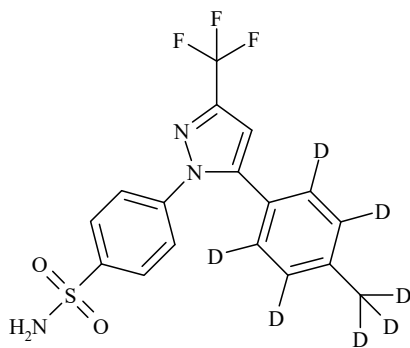
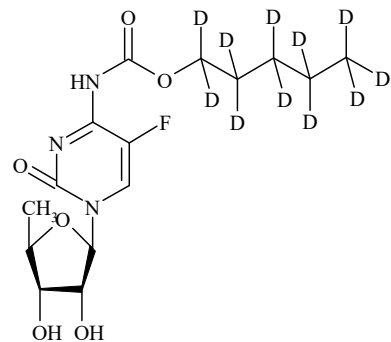
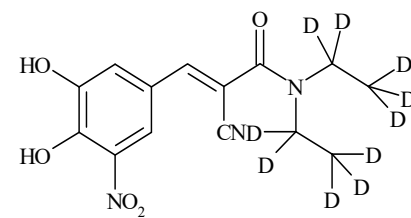
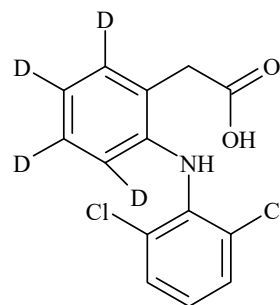
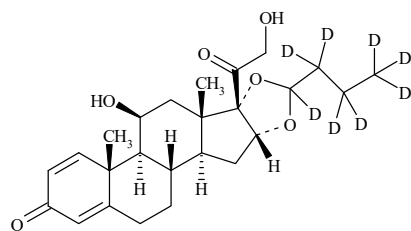
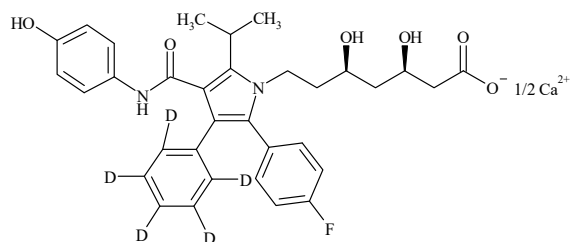
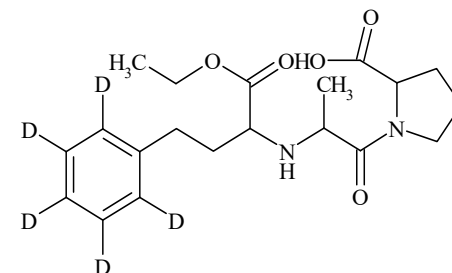
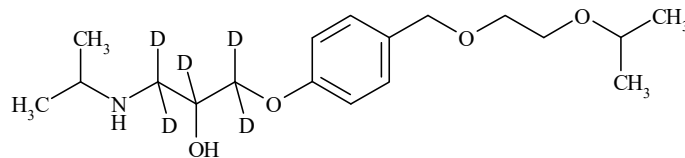
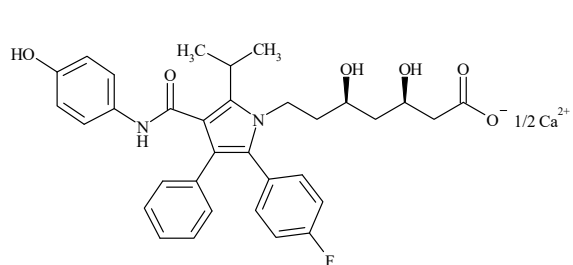


# Fmoc-Protected Amino Acids





# Lab Reference Compounds (APIs, Metabolites, impurities, ...)

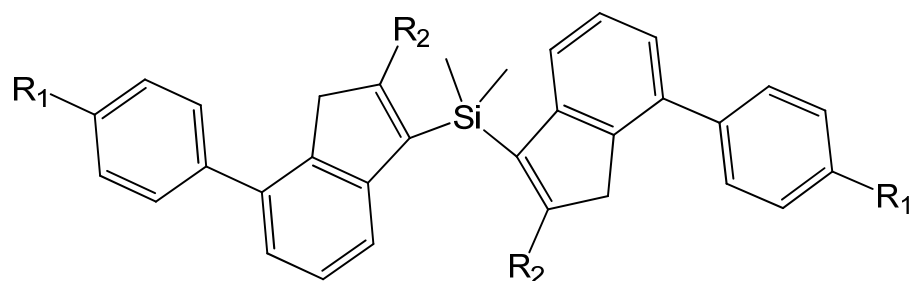


# Heterocyclic Compounds

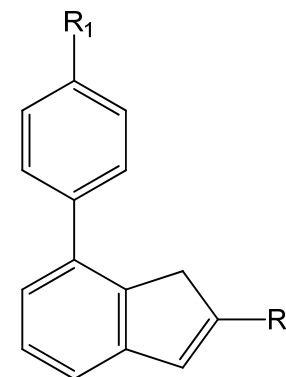
- *Pyridines, naphthyridines, and pyrazines*
- *Azabicyclo compounds and diazaspiro compounds*
- *Cyclopropane, cyclobutane, and cycloheptane compounds*
- *Indoles, azaindoles, oxindoles, isoindoles*
- *Indazoles*
- *Quinolines, hydroquinolines, isoquinolines, and pyranopyridines*
- *Pyrrolidines*
- *Thiophenes*
- *Protected amino acids, and oligonucleotides*
- *Biaryl compounds*

# Ligands for Industry Catalyst (1)

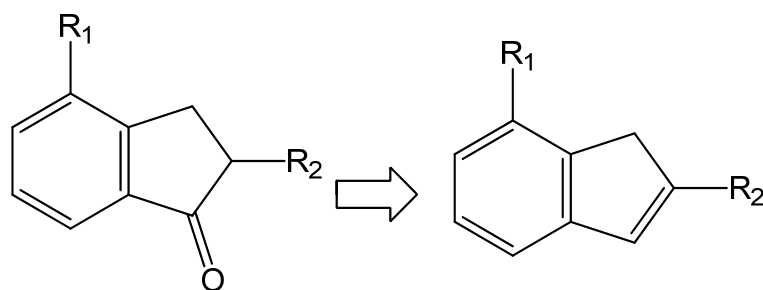
## Indanone and Indene Series



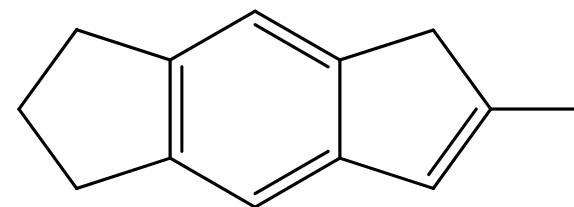
R1=H, Methyl, t-Butyl, etc.  
R2=H, Methyl, ethyl, iso-propyl, etc.



R1=H, Methyl, t-Butyl, etc.  
R2=H, Methyl, iso-propyl, etc.

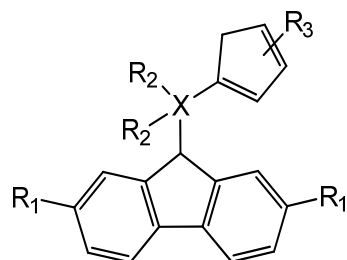


R1=H, Cl, Br  
R2=H, Methyl, Ethyl, iso-propyl, n-propyl, n-butyl, etc.

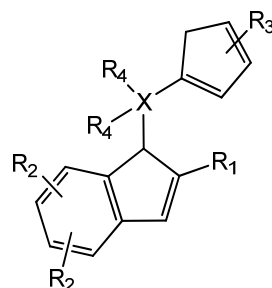


# Ligands for Industry Catalyst (2)

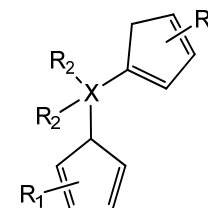
## Bridged Cyclopentadienyl Compounds



X=C, Si  
R<sub>1</sub>=H, t-Bu, etc.; R<sub>2</sub>=H, Me, Ph, etc.;  
R<sub>3</sub>=H, n-Bu, n-Pr, t-Bu, etc.

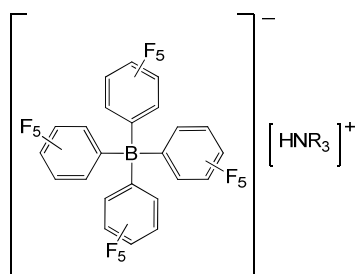


X=C, Si  
R<sub>1</sub>=H, Me, n-Bu, etc.; R<sub>2</sub>=H, Me, Ph, etc.;  
R<sub>3</sub>=H, n-Bu, n-Pr, t-Bu, etc., R<sub>4</sub>=Me, Ph, etc.

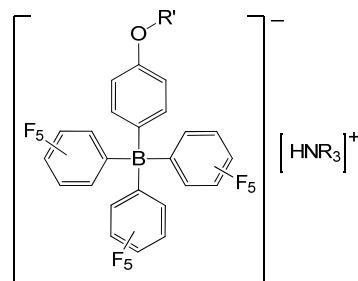


X=C, Si  
R<sub>1</sub>=H, Me, n-Bu, etc.; R<sub>2</sub>=H, Me, Ph, etc.;  
R<sub>3</sub>=H, n-Bu, n-Pr, t-Bu, etc.

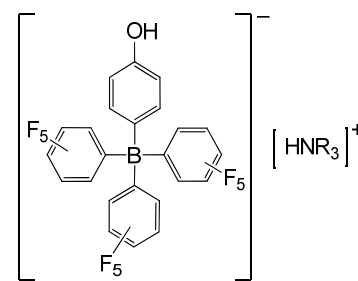
## Perfluorinated Aryl Borate Compounds



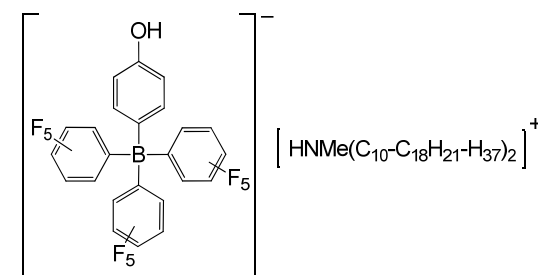
(a)



(b)

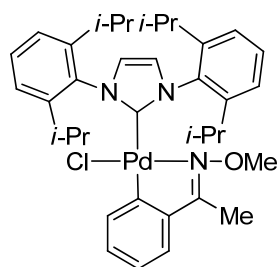


(c)



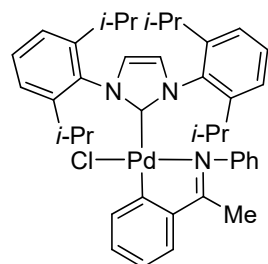
(d)

# Imine Ligated NHC-Pd Catalysts



## N-Methoxy-benzenemethanimine-chloro-[1,3-bis(mesityl)-imidazole-2-ylidene]palladium(II)

- 15.5% to 16.0% Palladium
- Ultra-low catalyst load as low as 0.005 mol%



## N-Phenyl-benzenemethanimine-chloro-[1,3-bis(mesityl)-imidazole-2-ylidene]palladium(II)

- 14.3% to 14.8% Palladium
- Ultra-low catalyst load as low as 0.001 mol%

$$\text{ArCl (7)} + \text{ArB(OH)}_2 \xrightarrow[\text{PrOH/H}_2\text{O, 80 }^\circ\text{C}]{\text{Cat. 6 (0.005 mol\%), KOH (1.5 equiv)}} \text{Ar-Ar' (9)}$$

Entry <sup>a</sup>	Aryl chlorides	Boronic acids	Product	Yield <sup>b</sup> (%)		
				6a	6c	6d
1			9a	87 (85)	85	
2			9b	>99 (92)	>99	
3			9c	92 (86)	94	
4			9d	96 (92)	94	
5			9e	88 (84)	87	
6			9f	93 (89)	97	
7			9g	93 (86)	99	
8			9h	>99 (96)	>99	
9			9i	95 (91)	98	
10			9j	95 (88)	95	
11			9k	96 (90)	99	
12			9l	>99 (91)	>99	
13			9m	99 (97)	>99	
14			9n	91 (86)	97	
15			9o	>99 (93)	96	
16			9p	90 (84)	99	
17			9q	93 (85)	96	

Entry <sup>a</sup>	Aryl chlorides	Boronic acids	Product	Yield <sup>b</sup> (%)		
				6a	6c	6d
1			9b	82	98	88
2			9k	88	97	81
3			9l	37	99	98
4			9d	56	92	39
5			9o	69	92	45
6			9n	73	90	80
7			9p	75	91	88
8			9h	93	98	96
9			9j	87	92	94
10			9m	93	96	96

<sup>a</sup> Reaction condition: catalyst **6** (0.005 mol%), ArCl **7** (3.0 mmol), ArB(OH)<sub>2</sub> **8** (3.15 mmol, 1.05 equiv), KOH (4.5 mmol, 1.5 equiv), <sup>b</sup>PrOH/H<sub>2</sub>O = 10:1 (5 mL). Reactions were completed in 2 h.

<sup>b</sup> GC yield based on ArCl **7**.



## Specialty Ingredients

DL Panthenol [USP]	DL-Panthenol Ethyl Ether [USP]
Kojic acid [USP]	Vitamin E acetate [USP]
Sodium dehydroacetate [USP]	Potassium sorbate [USP]
L-Cysteine [USP]	alpha-Lipoic Acid [USP]
L-Cystine [USP]	Mandelic acid [USP]
Coenzyme Q10 (CoQ 10)	Itaconic acid
ε-Polylysine	Glycine ethyl ester HCl

## Specialty Additives

Rheology Modifiers/Thickeners (Non-ionic Associated & Alkali-swellable)  
Dispersants  
Surfactants  
Adhesion Promoters  
UV Stabilizers/Antioxidants  
Silanes and Silicone Crosslinkers  
Diisocyanates

## Green Building Blocks

LA, LAE and LAB:	Levulinic Acid, Ethyl & Butyl Ester Uses for making green solvents, plasticizers & starting materials
IA:	Itaconic Acid Uses for making acid functional copolymers and emulsions

## Catalyst Ligands

# Summary

- **Chemistry and Technology-Driving, and well-balanced business portfolio serving pharma/biotech and specialty chemical markets**
- **A Privately held, USA-based custom chemistry developer and manufacturer with 27+ years of proven track record**
- **Unique expertise in multi-step challenging chemistry, process scale-up, custom manufacturing, and application development, coped with competent manufacturing capability**
- **R&D in USA focusing on new developments in technology, process, and applications, enabling business successes while streamlining lean manufacturing in China**
- **A one-stop custom chemistry solution platform serving drug discovery/development/manufacturing processes**

***We Appreciate Your Attention!***