



Symyx® News

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New Symyx Offerings Speed Polymerization Catalysis Research

Chemical companies seeking next-generation materials and breakthrough process optimization now have the opportunity to tap into nearly a decade of experience and know-how accumulated at Symyx.

Through Symyx Research, clients can now access high-throughput experimentation and analytic capabilities for catalyst discovery and development through a flexible, customer-driven, fee-for-service model. Symyx Research is also offering access to one of the largest commercially available ligand archives designed for polyolefin and homogeneous catalysis chemistry.

"Discovering new catalysts requires screening a broad range of ligands and parameters, which results in a large number of experiments," says Gary Diamond, a distinguished scientist at Symyx.



Access Symyx people and technology through fee-for-service or joint development research programs.

"Symyx Research provides the means and the know-how to help clients investigate a large, diverse catalyst design and optimization space in months rather than years—and invest their talent and energy in the results rather than hardware and infrastructure."

Leveraging collaborations

Since 1999, Symyx has worked closely with some of the world's largest chemical companies. The collaborations have focused on the development of high-throughput workflows and technologies that accelerate new catalyst discovery and process optimization.

One widely reported outcome of these collaborations was VERSIFY™ Plastomers and Elastomers, a copolymer family launched by Dow Chemical Company in 2004. Dow researchers use the novel catalyst technology discovered and developed by Symyx in conjunction with Dow's proprietary INSITE™ Technology and Solution Process to precisely control polymer microstructure. The resulting polymers confer a variety of benefits that can improve optics, sealing and hot tack performance, elasticity, flexibility, and softness for flexible and rigid packaging producers, manufacturers of thermoplastic elastomer products, and converters in the consumer product sector. The VERSIFY product line has been so successful that last year Dow expanded it from two grades to 10.

According to Diamond, Symyx's participation in large-scale collaborations like the one with Dow has made it the leading developer of high-throughput technologies for catalyst discovery and process optimization for polyolefins, polymerization catalysis, and homogeneous catalysis more generally. "We understand the process from start to finish like no one else," Diamond explains. Symyx Research now enables clients to apply this understanding to projects across a range of commercial offerings from joint development to fee-for-service agreements in which clients control both the science performed and the resulting intellectual property.

“Our proven methodologies, sophisticated high-throughput tools, and comprehensive analytics let clients invest their talent and energy in results rather than hardware and infrastructure,” Diamond says.

Ready-to-use ligand archive

A lack of information on possible ligands often stymies clients in discovering and developing catalysts. Symyx Research is now making available its extensive archive of polyolefin and homogeneous catalysis ligands. Containing over 6,000 ligands, the archive is one of the largest available commercially. The fully searchable ligand database can be searched by substructure, and the ligands themselves are pure, fully characterized, and stored in solid form in an inert atmosphere.



Expand research breadth by accessing polyolefin and homogeneous catalysis ligands and families from an archive of over 6000 ligands.

The ligand archive has proven value—all of the Symyx-discovered catalysts for polyolefin materials available commercially or in pilot trials came from this archive. Diamond notes that Symyx-developed organic synthesis and optimization technology was crucial to the production of this archive. “To obtain this many high-quality ligands, you have to deploy general, high-yielding reaction conditions and targeted, cost-saving strategies,” Diamond says.

Research what you want, your way

The ligand archive complements Symyx’s extensive research services capabilities in polymerization catalysis and homogeneous catalysis. Symyx research services can be applied to specific single-site and Ziegler-Natta,



Access a breadth of high-throughput experimentation and analytical testing capabilities.

solution, and supported catalysts. Clients can access Symyx’s capabilities and know-how to screen target metals and ligand families as well as conditions that yield significant improvements to catalyst performance. Clients can also commission Symyx to optimize new catalysts discovered at their sites or at Symyx, running up to 96 experiments per week under varied reaction conditions and analyzing final products using a range of techniques. In all cases, clients receive not just a report, but complete data on their catalyst or process, including:

- Catalyst synthesis and polymerization details such as chemical composition and physical parameters in each tested cell
- Reaction data such as activity, productivity, real-time pressure, temperature, total gas uptake, and gas uptake rate curves
- Polymer properties such as molecular weight, molecular weight distribution, comonomer incorporation, tacticity, T_m , T_g , and other properties obtained using Symyx high-throughput GPC, FTIR, Raman, GPC, GC, or DSC

Many focused projects can often be completed in as little as three months, while more diverse or extensive projects can easily be custom scaled to the right size to fit budgets while achieving the best possible results. Catalyst discovery projects are billed by the experiment starting at less than \$100; actual cost varies depending on reactor technology, product characterization requirements, and overall project scope.

To learn more about Symyx research services for polyolefins, polymerization catalysis, and homogeneous catalysis, visit www.symyx.com/research/catalysis.