

Newsletter

Single-site catalysts: The Opportunity for Production of Advanced Polyolefins

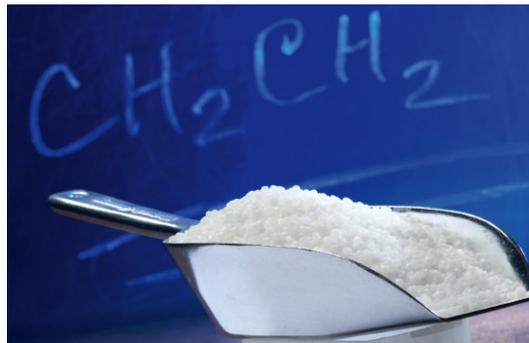
Summary:

As a result of low feedstock prices and increasing competition standard polyolefins have been suffering from eroding prices and profitability levels, recently.

Value-added polyolefins with superior properties can help to improve the competitive position as well as the profitability of polyolefin producers.

„Single-site“ catalysis is the technology of choice to tailor polyolefins according to specific needs and to produce resin grades with superior performance and added value.

BU Source is ready to support polyolefin manufacturers who intend to implement such advantageous catalyst systems.



Current Challenges in the Polyolefin Industry

The downturn of feedstock prices and its impact on profitability represents a significant risk for the long term profitability of polyolefin manufacturing.

In conjunction with the slowdown of regional economies plants with capacities of 400 kt pa and more of standard bulk polyolefins may suffer from underutilization which would further jeopardize profitability.

Additional capacities for bulk materials combined with lower demand growth rates causes oversupply for the upcoming years.

As a result of these trends price levels for standard polyolefins are expected to stay low short and mid term.

The Opportunity

With the expansion of polyolefins into applications covered by other polymers so far, there is a growing need to design polyolefin resins for meeting very specific and stringent requirements. For example, packaging and agricultural film need to be more tear resistant, injection molded articles more impact resistant. Better organoleptics, transparency and barrier properties are important for many applications, like food packaging or piping for drinking water. Moreover, polymer processing speed and reduced material consumption are key important features not always met by standard resins.

Conventional „multiple-site“ catalyst technologies based on developments dating back more than half of a century, meanwhile, have reached their limitations in meeting these emerging needs.

About 25 years ago so-called „single-site“ catalysts (SSC´s) were developed by major (petro-)chemical companies, like BASF, Dow, ExxonMobil and former Hoechst in collaboration with universities (Prof. Kaminsky, Prof. Sinn, Hamburg, Germany, Prof. Brintzinger, Konstanz, Germany among others).

Meanwhile, this new catalyst technology was successfully introduced by several major polyolefin companies. As a result of superior performance features mentioned above, SSC based polyolefin resins enjoy overproportional growth rates, globally. Actually, the share of SSC´s has reached about 12-13 % representing a value of about \$ 625 Million, globally. Continued overproportional growth is being forecasted to be about 10%, annually.

Issues related to manufacturing economics, appropriate market pricing, quality and availability of catalyst components, like metallocenes and activators, as well as acceptance by the downstream processing industry have been resolved, so that the future perspectives for SSC based polyolefins are very good.

Improved properties of SSC based polyolefins include

- better density adjustment by improved comonomer incorporation
- thinner films with better tear resistance and clarity
- organoleptics and barrier properties
- HDPE with higher mechanical strength and longterm stability
- higher processing speed and opportunity for less stabilizer consumption

Exciting Possibilities

By employing „single-site“ catalysts based on metallocenes and activators polymer properties can be tailored in order to meet specific needs. These tailored grades are a perfect product portfolio addition. They represent added value for the customer, demonstrate the manufacturer´s capabilities as a leading supplier and, thus, contribute to improved profitability and competitiveness. Existing plants can be retrofitted for the use of SSC´s in many cases and process licensors may offer support to implement this advanced technology.

Typically, a single-site catalyst system has three major components. The metallocene pro-catalyst, the activator or co-catalyst which can be methylaluminoxane (MAO) or a tris-(pentafluorophenyl) borate and an inorganic support material, often a specific microspheroidal silica grade with defined morphology.

Such a supported, heterogeneous catalyst is suitable for slurry and gas phase processes, whereas a homogeneous catalyst system is being used in solution processes and does not require an inorganic support material.

Specific process related technical information is available from the major process licensors.

The catalyst components needed are available from various sources.

Considering the specific situation of a customer BU Source can elaborate possibilities to use SSC catalyst systems including supply of metallocenes and activator materials from reliable producers.



Our Offer

Being a team of qualified and experienced senior professionals with specific expertise in the area of advanced polyolefin catalysis we can help our customers to successfully implement „single-site“ catalysts and, thus, manufacture advanced polyolefin grades, like LLDPE, MDPE, HDPE, PP homo- and copolymer, all of them with those superior performance characteristics mentioned above.

Our service includes technical and commercial consulting as well as sourcing of metallocene and activator products from our network of reliable producers.

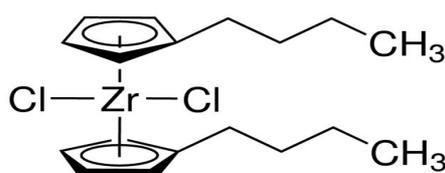
Polyolefin producers seriously considering the manufacture of SSC-based polyolefins can take advantage of the modular service offering of BU Source ranging from consulting and sourcing services to professional project management.

BU Source is a neutral player and well positioned to provide professional and fact-oriented support according to customers needs. Our philosophy is to provide the best advice possible including potential limitations.

Path Forward

Should you be interested in exploring the advantages of SSC based polyolefins, we are prepared make a concept presentation. After your review and mutual discussion the path forward may comprise the following steps:

- Technical and commercial support so as to define an SSC feasibility study. These services will be charged on working time employed.
- Once technical viability has been confirmed you may evaluate the business case and make a go or no-go decision.
- In case of a go decision we can define a project including milestones and objectives. Our support will be charged based on working time employed, project milestones and achievements.
- In case you prefer to take advantage of our sourcing services only, a sales commission is part of our product pricing.

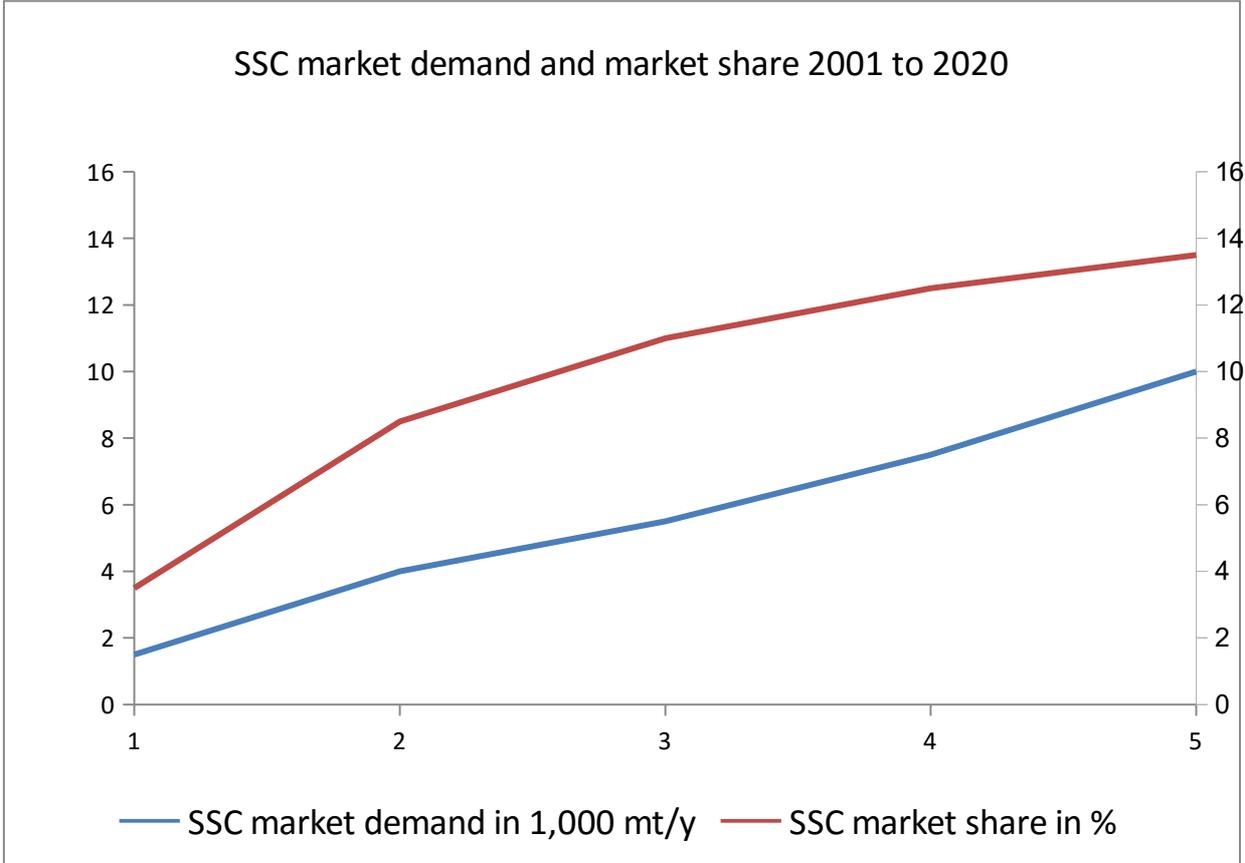


Market Development

Due to advantageous polymer features and growing market acceptance SSC's have been enjoying healthy growth rates and are predicted to do so in the foreseeable future.

The diagram on the next page is showing recent and future developments.

More details can be discussed in face-to-face meetings.



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Literature

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