

# **GLOBAL METALLOCENES**

**Markets, Technologies & Trends**

**2006-2011**

**Prospectus For  
An In-Depth Market Study**

**What is the status of metallocene technology, markets, and products?**

**What is the penetration rate of metallocene products in North & South America,**

**Western & Eastern Europe, China, Asia-Pacific, and Middle East/Africa?**

**How has metallocene technology impacted the polyolefins industry?**

**Where are ESI, VERSIPOL, METOCENE, STAR catalyst technologies?**



**Who are the key producers of metallocene catalysts, catalyst components, and metallocene-based polyolefins worldwide?**

**Do the developing economies need Metallocenes?**

**What are the major metallocene and other single-site catalyst families?**

**What are the critical enablers for metallocene products by region?**

**What and who are the main drivers?**

**Where is metallocene technology headed?**



**What is the status of metallocene polyolefins vs. conventional polymers?**

**What are the performance criteria and unmet needs for metallocene polyolefins?**

**Metallocenes – Specialties? Diff. Commodities? Commodities?**

**Market & Technology Position by Major Suppliers**

**Global Process & Product Mapping of Major Players**

**Strategic Recommendations by Region, Supplier, End Users, & R&D Activities**



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# GLOBAL METALLOCENES

## Markets, Technologies & Trends 2006-2011

### INTRODUCTION

The early 90s marked the birth of the metallocene polyolefins & elastomers industry. The period of the mid 90s served as technical and marketing proving grounds for (1) the plastomers and elastomers introduced initially by Exxon and Dow; (2) the metallocene-based LLDPEs introduced by Exxon and Dow plus other players such as Borealis, Basell, Japan Polychem Corporation, Japan Polyolefins, Mitsui Chemicals and ChevronPhillips, and (3) the metallocene-based polypropylene lines introduced by Exxon, Basell(Targor), and Total(Fina).

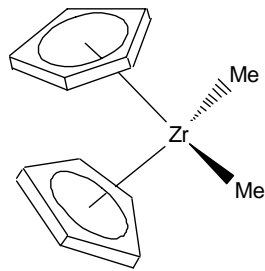
In the late 90s the polyolefins industry witnessed the maturation of metallocene-based polyolefins, especially ethylene-based products. Ethylene-based elastomers, plastomers and LLDPE quickly made inroads into polymer medication, film, W&C, and other applications. During that time, propylene-based products were primarily restricted to stiffer/high modulus end-uses such as fibers. However, over the past five years, propylene-based elastomers/plastomers have started to penetrate into more flexible applications as a result of metallocene catalyst development and optimization.

Metallocene catalysts and resulting products are only now beginning to grow beyond the usage of the technology developers. Metallocene-based resins were initially positioned as specialties and have slowly transitioned into differentiated commodities. As such, the technology which was held by a privileged few is becoming more widespread via licensing and cross-licensing catalyst agreements. Examples of metallocene catalyst licensing include, Titan Polyethylene and Univation, Sumitomo and ExxonMobil, Nova and BP, and many others. Metallocene catalysts & products have become global and are poised for healthy growth over the next five years.

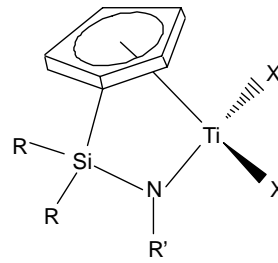
### A TIMELY STRATEGIC STUDY

**This multiclient study builds upon our successfully published study *Metallocene 2000*.** Chemical Market Resources, Inc., with our extensive experience in (1) worldwide polyolefins catalysts markets and technologies, (2) catalysts & polyolefin suppliers, and (3) global value chain analysis, is undertaking a comprehensive global strategic business/technical analysis that reports on this fast-changing arena. Our in-depth examination and methodology are designed to assist companies in monitoring the rapid developments, analyzing the trends and capitalizing on the many opportunities in these changing markets and technologies.

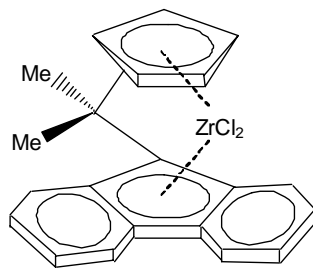
The report will benefit: (1) catalysts market participants, (2) polyolefins & elastomers producers, (3) technology licensors, (4) investment banks & equity research analysts, (5) other polyolefin industry participants. Technology, market managers and strategy planning managers attempting to form a market participation strategy in these global evolving markets will immensely benefit from this study.



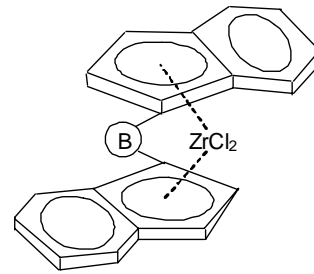
(a)  
Exxon's Exxpol



(b)  
Dow's Insite

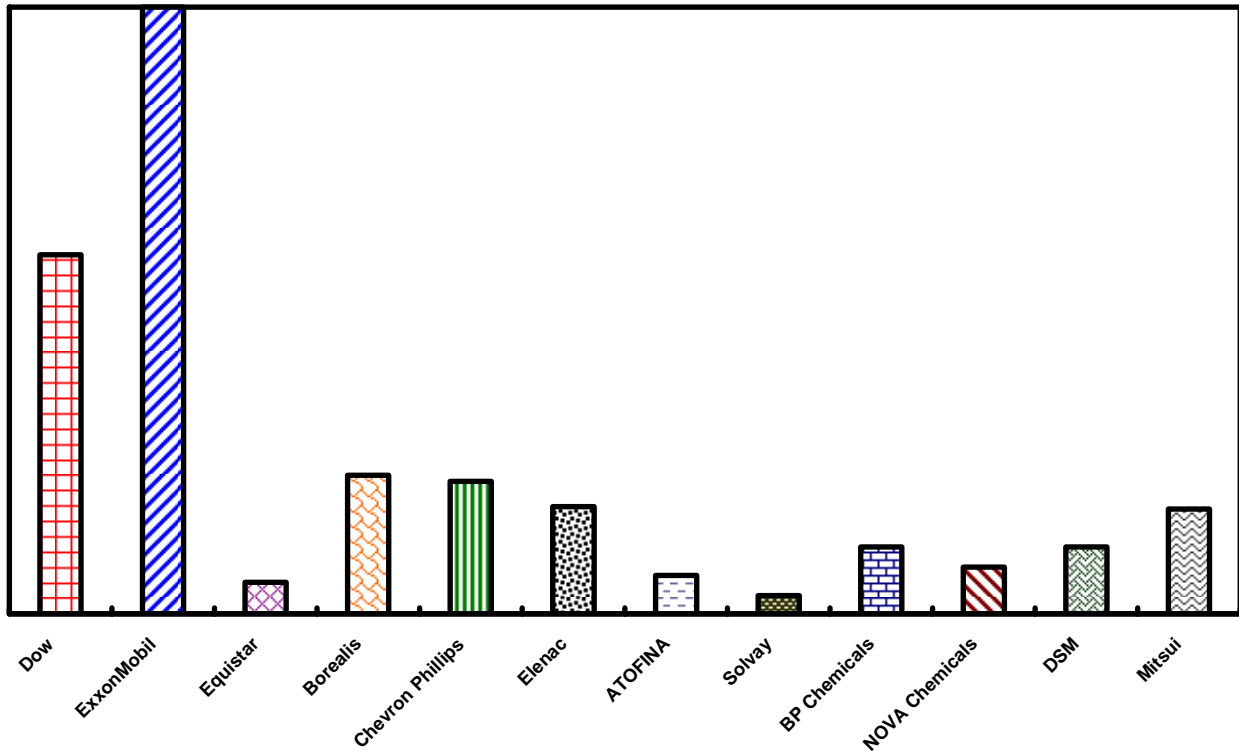


(c)  
ATOFINA's sPP Catalyst



(d)  
Targor's iPP Catalyst  
Actual precursors have substituted Ind rings

### Analysis of Historical Metallocene Catalyst Technology Efforts-Polyethylene



## **KEY ISSUES ADDRESSED**

*History of the development of metallocene catalysts beginning with the seminal work of Giulio Natta in the 50s.*

*Coverage of metallocene and other single site families, patent positions, and intellectual-property issues; assessment of current and future catalyst polymer technologies.*

*Introduction to the major polyolefins production technologies that can accommodate metallocene catalysts*

*Processability, optical, mechanical, and other properties of metallocene-based polyolefins and how they compare to incumbent polyolefins*

*Key producers of metallocene catalysts, catalysts components, and metallocene-based polyolefins worldwide*

*Assessment of worldwide joint-development programs in single-site catalyst technologies*

*Current status and the future direction of metallocene polyolefin technology*

*The impact of metallocene polyolefins on major end users and applications*

*Outline of the global markets for metallocene-based polyolefins in terms of the impact of these materials on conventional polyolefins and other polymers*

*Market and technology positioning of the major suppliers*

*Evaluation of metallocene-based polyolefins in terms of performance and unmet needs*

## **APPROACH**

The information, data, and conclusions of this analysis developed from sources in Americas, Europe, Japan, China, Asia, Middle East, and Rest of the World are based upon, but not limited to, the following methods:

*Interviews with leading polyolefins and catalyst suppliers and end users*

*Search, review, and interpretation of information from individual organizations, government sources, trade and industry groups, government agencies, published articles, and product promotional information*

*Public-domain information from the dozens of projects Chemical Market Resources, Inc. has undertaken over the past 5 years*

*Information from our extensive, on-going coverage of the industry found in our publication, NEW GENERATION POLYOLEFINS – A Global Bimonthly Review (Call for a complimentary copy!)*

*Thorough analysis by our highly talented group of engineers, scientists, and MBAs – our work is unparalleled in quality and depth*

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