

# The Catalytic Process Industries in China – Update 2013

## Segment Report: Environmental Catalysts (June 2013)

### TABLE OF CONTENTS

<b>SECTION I. INTRODUCTION.....</b>	<b>1</b>
<b>SECTION II. EXECUTIVE SUMMARY .....</b>	<b>3</b>
A. Issues Affecting Environmental Catalysts in China .....	3
B. Emission Pollution in China – Current Status .....	5
1. Mobile Pollutant (Motor Vehicle) Catalysts .....	5
2. Stationary Pollutant Catalysts.....	8
a. SCR catalysts .....	8
b. Claus desulfurization catalysts.....	11
C. Other Areas/Technologies in Emission Control.....	12
1. Catalysts for Waste Water Treatment.....	12
2. Photo-catalysts.....	12
3. Fuel Cells.....	13
D. Remaining Challenges in Emission Control.....	13
<b>SECTION III. ENVIRONMENTAL CATALYST INDUSTRY IN CHINA.....</b>	<b>15</b>
A. General.....	15
1. Present Status of Emission Pollution in China.....	16
2. Introduction of Environmental Catalysts .....	19
a. Mobile pollutant catalysts .....	19
i. Automobiles.....	19
ii. Motorcycles .....	20
b. Stationary pollutant catalysts .....	21
i. Denitration catalysts .....	21
ii. Desulfurization catalysts.....	22
3. Laws, Regulations and Policies in China .....	22
a. Mobile pollutant catalysts .....	22
i. Announcement of the State Environmental Protection Administration .....	22
ii. National III and IV emission standards for light vehicles and dates for implementation .....	23
iii. National pollutant emission standards for motorcycles.....	23
b. Stationary pollutant catalysts .....	24

i.	Total emission amount control plan of the State Council for major pollutants during the 12 <sup>th</sup> Five-year Plan period.....	24
ii.	Standard for Atmospheric Pollutant Emission in Thermal Power Plants.....	27
iii.	Technical Code for Flue Gas Denitration in Thermal Power Plants: Selective Catalytic Reduction Process.....	27
iv.	Technical Code for Flue Gas Denitration in Thermal Power Plants: Selective Non-Catalytic Reduction Process .....	27
v.	Guideline for Major High-Tech Commercialization Sectors with Development Priority (2011).....	28
vi.	Technical Standard for “Coal Combustion Flue Gas Denitration Technologies and Equipment.....	28
vii.	Methods for the Calculation of the N <sub>2</sub> O Emission Amount in Nitric Acid Producers” .....	28
viii.	Standard for Atmospheric Pollutant Emission in the Cement Sector .....	29
B.	Structure of the Sector .....	33
1.	Mobile Pollutant Catalysts .....	33
2.	Stationary Pollutant Catalysts.....	35
a.	SCR catalysts .....	35
b.	Desulfurization catalysts .....	35
C.	Analysis of the Market Supply/Demand Balance.....	36
1.	Production of Environmental Catalysts.....	36
a.	Mobile pollutant catalysts .....	36
b.	Stationary pollutant catalysts .....	43
i.	Total output of SCR catalysts .....	43
ii.	Producers of SCR catalysts.....	43
iii.	Contact details for producers of SCR catalysts .....	48
iv.	Production of Claus desulfurization catalysts.....	50
v.	Contact details for major producers of Claus desulfurization catalysts.....	52
2.	Consumption and Consumers of Environmental Catalysts .....	53
a.	Mobile pollutant catalysts .....	53
i.	Output of motor vehicles .....	53
ii.	Consumption of catalysts.....	53

b. Stationary pollutant catalysts .....	56
i. Consumption of SCR catalysts .....	56
ii. Downstream users of SCR catalysts .....	57
iii. Consumption of desulfurization catalysts.....	60
3. Analysis of Supply/Demand Balance .....	62
a. Mobile pollutant catalysts .....	62
b. SCR denitration catalysts .....	62
c. Desulfurization catalysts .....	62
D. Imports and Exports.....	63
1. Mobile Pollutant Catalysts .....	63
2. Stationary Pollutant Catalysts.....	64
E. Price Changes and Factors Affecting Price .....	65
F. Market Growth and Affecting Factors.....	66
1. Mobile Pollutant Catalysts .....	66
a. Supply projection .....	66
b. Demand projection.....	66
2. Stationary Pollutant Catalysts.....	67
a. SCR catalysts .....	67
b. Claus desulfurization catalysts.....	70
G. Environmental Catalyst Technologies .....	71
1. Mobile Pollutant Catalyst Technologies .....	71
2. SCR Catalyst Technologies.....	71
3. Claus Catalyst Technologies .....	72

**SECTION IV. ISSUES AND CONCERNS IN THE CHINESE ENVIRONMENTAL CATALYST INDUSTRY ..... 75**

A. The Chinese Approach .....	75
B. Problems and Points of Attention in Mobile Emission Catalysts.....	76
1. Mobile Emission Catalysts .....	76
a. Catalytic conversion rate.....	76
b. Catalyst deactivation .....	76
c. Cold start .....	76
d. Cost .....	76
e. Readjustment orientation of industrial policies .....	76

2. Stationary Pollutant Catalysts.....	77
a. Development orientation of environmental protection policies.....	77
b. Enforcement of environmental protection policies.....	77
c. Safety problem in operation.....	77
<b>SECTION V. OPPORTUNITIES AND THREATS TO THE CURRENT SITUATION IN THE CHINESE ENVIRONMENTAL CATALYST INDUSTRY.....</b>	<b>79</b>
A. Opportunities .....	79
1. Mobile Pollutant Catalysts .....	79
a. Implementation of standards for new vehicles .....	79
b. Implementation of standards for vehicles in service.....	79
c. Brisk demand growth of automobiles promoted by economic growth.....	80
d. Stricter environmental protection policies and higher motor vehicle tail gas emission standards.....	80
e. Enhanced awareness of enterprises and society in environmental protection.....	81
f. Standards for oil product quality lagging behind standards for automobile emission, a negative factor for the implementation of high standards for motor vehicle tail gas emission.....	81
2. Stationary Pollutant Catalysts.....	81
a. Policy promoting factors .....	81
b. Market promoting factors.....	84
B. Threats .....	85
1. Expansion of Capacity and Upgrading of Domestic Technology .....	85
2. Entry of New Foreign Companies.....	86
3. Lack of Denitration Catalyst Production Technologies with Intellectual Property Rights and Redundant Introduction of Foreign Technologies.....	86
4. Need of Standardized Management to Chaotic Competition in the Denitration Catalyst Market .....	87
<b>SECTION VI. STRATEGIES AND RECOMMENDATIONS.....</b>	<b>89</b>

## FIGURES

Figure III-1	Shapes of Automobile Three-way Ceramic-Support Catalysts .....	20
Figure III-2	Shapes of Motorcycle Metal-Support Catalysts.....	21
Figure III-3	Shapes of SCR Catalysts.....	22

## TABLES

Table II-1	Worldwide Market for Pollution Control Catalysts by Application, 2009-2017 (US\$MIL) .....	4
Table II-2	Major Producers and Capacities of Motor Vehicle Catalysts .....	6
Table II-3	Supply/Demand Balance of Motor Vehicle Ceramic-Support Catalysts .....	6
Table II-4	Demand Projection of Motor Vehicle Catalysts .....	7
Table II-5	Major Producers and Capacities of SCR Catalysts in China .....	8
Table II-6	Consumption Trend of SCR Catalysts in China, 2000-2011 .....	9
Table II-7	Market Prospect of SCR Catalysts in Thermal Power Plants of China, 2011-2016.....	10
Table II-8	Major Producers and Capacities of Claus Desulfurization Catalysts in China.....	11
Table II-9	Supply/Demand Balance of Claus Catalysts in China and Projection .....	12
Table III-1	Total Amount and Output of Civil Automobiles and Motorcycles in China .....	16
Table III-2	Output of Thermal Power in China.....	17
Table III-3	Emission Amount of Major Pollutants in China .....	19
Table III-4	Emission Limits of Pollutants in China .....	24
Table III-5	Dates for Implementation of Standards in China.....	24
Table III-6	Total Emission Amount Control Plan for NO <sub>x</sub> and SO <sub>2</sub> in Various Provinces of China During the 12 <sup>th</sup> Five-year Plan Period.....	25
Table III-7	Laws, Regulations and Policies Related to NO <sub>x</sub> and SO <sub>2</sub> Emission Standards in China.....	29
Table III-8	Ownership of Major Producers of Motor Vehicle Catalysts.....	33
Table III-9	Ownership of Major Producers of SCR Catalysts.....	35
Table III-10	Ownership of Major Producers of Desulfurization Catalysts .....	36
Table III-11	Major Producers and Capacities of Motor Vehicle Catalysts .....	36
Table III-12	Contact Details for the Major Producers of Motor Vehicle Environmental Catalysts in China.....	40
Table III-13	Production of SCR Catalysts in China, 2006-2012.....	43
Table III-14	Major Producers and Capacities of SCR Catalysts in China .....	44
Table III-15	Contact Details for Major Producers of SCR Catalysts in China ...	48

Table III-16	Major Producers and Capacities of Claus Desulfurization Catalysts in China.....	51
Table III-17	Contact Details for Major Producers of Claus Desulfurization Catalysts in China.....	52
Table III-18	Total Output of Automobiles and Motorcycles in China.....	53
Table III-19	Consumption of Motor Vehicle Ceramic-Support Catalysts .....	55
Table III-20	Producers and Capacities of Motor Vehicle Tail Gas Catalytic Converters in China.....	55
Table III-21	Consumption Trend of SCR Catalysts in China During 2000-2011.....	57
Table III-22	Volume of Denitration Projects Completed by Major Environmental Protection Companies in China in 2011 .....	58
Table III-23	Major End Users of SCR Catalyst Producers in China in 2012.....	59
Table III-24	Consumption Trend of Claus Desulfurization Catalysts in China During 2006-2011 .....	61
Table III-25	Major Users of Desulfurization Catalysts in China in 2011 .....	61
Table III-26	Supply/Demand Balance of Motor Vehicle Ceramic-support Catalysts, 2006-2016.....	62
Table III-27	Supply/Demand Balance of Claus Desulfurization Catalysts in China During 2006-2016.....	63
Table III-28	Imports and Exports of Motor Vehicle Catalysts in China, 2006-2011.....	63
Table III-29	Imports and Exports of SCR Catalysts in China, 2008-2012.....	64
Table III-30	Imports and Exports of Desulfurization Catalysts in China, 2006-2011.....	65
Table III-31	Demand Projection of Motor Vehicle Catalysts, 2006-2016 .....	67
Table III-32	SCR Catalyst Projects Being Constructed or Planned for Construction in China.....	68
Table III-33	Market Prospect of Thermal Power Station SCR Catalysts in China, 2011-2016 .....	69
Table III-34	Consumption of Claus Desulfurization Catalysts in China, 2006-2016.....	70
Table III-35	R&D Trends in SCR Catalysts with Intellectual Property Rights in China .....	72
Table V-1	Average Annual Growth of GDP in China and the Total Amount and Output of Civil Automobiles, 2006-2011.....	80

**ORDER FORM AND SECRECY AGREEMENT**

The Catalyst Group Resources, Inc.  
 Gwynedd Office Park  
 P.O. Box 680  
 Spring House, PA 19477 -USA-

Tel: +1-215-628-4447  
 Fax: +1-215-628-2267  
 e-mail: tcgr@catalystgrp.com  
 website: www.catalystgrp.com

\_\_\_\_\_ Please enter our order for your report series entitled ***“The Catalytic Process Industries in China - Markets, Technologies & Strategic Implications - Update 2013,”*** to be completed, on a segment-by-segment basis, in Q2, 2013. The cost of one of the “segment reports” is US\$11,500; two segments are US\$18,500; three segments are US\$24,500 and all four segment reports are US\$29,500. The segment reports we are ordering are:

<u>Segment Report Title</u>	<u>Selected (mark w/ “X”)</u>	<u>Expected Completion</u>
Refining Catalysts in PRC	_____	April 2013
Petrochemical/Chemical Catalysts in PRC	_____	May 2013
Polymerization Catalysts in PRC	_____	May 2013
Environmental Catalysts in PRC	_____	June 2013

\_\_\_\_\_ Please enter our order for each segment report to be delivered in PDF (Adobe Acrobat) format for use across our sites/locations for an additional \$US1,000 (each segment).

\_\_\_\_\_ \* \* \* We are subscribers to the 2005 multi-client series ***“The Catalytic Process Industries in China - Markets, Technologies & Strategic Implications”*** and are therefore entitled to the discounted subscription rate. \* \* \*

**In signing this order form our company agrees to hold this report(s) confidential and not make them available to subsidiaries unless a controlling interest (>50%) exists.**

Signature: \_\_\_\_\_ Date: \_\_\_\_\_

Name: \_\_\_\_\_ Title: \_\_\_\_\_

Company: \_\_\_\_\_

Billing Address: \_\_\_\_\_

Shipping Address (no P.O. Boxes): \_\_\_\_\_

Express delivery services will not deliver to P.O. Boxes

City: \_\_\_\_\_ State/Country: \_\_\_\_\_

Zip/Postal Code: \_\_\_\_\_ Phone: \_\_\_\_\_

E-mail: \_\_\_\_\_ Fax: \_\_\_\_\_

This report and the study findings are sold for the exclusive use of the client companies and their employees only. No other use, duplication, or publication of this report or any part contained herein is permitted without the expressed written consent of The Catalyst Group Resources.