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## DENKI KAGAKU KOGYO K.K.

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Section

*Creating value from resources by harnessing advanced technologies*

DENKIKAGAKU KOGYO KABUSHIKI KAISHA (hereinafter DENKA or the Company) was established in 1915 as a manufacturer and seller of carbide\*, a compound of lime and coke, and lime nitrogen, a chemical fertilizer produced from carbide. DENKA owes its roots to Dr. Tsuneichi Fujiyama, a chemist who succeeded in the industrial production of carbide in Sakyozaawa, a suburb of Sendai City in Miyagi Prefecture, for the first time in Japan in 1902.

In the initial years of the Meiji Era (1868-1912), Miyagi Spinning Co., Ltd. was founded in Sankyozaawa, where a hydroelectric power station was also built and which is known as the birthplace of the Japanese electrochemical industry. Dr. Fujiyama succeeded in producing carbide in an electric furnace powered by the hydroelectric power station. It took place just ten years after Canadian chemist Thomas Wilson succeeded in the world's first industrial production of carbide in 1892. Dr. Fujiyama was also the first in Japan to introduce technology to produce lime nitrogen from carbide, establishing the Hokkai Carbide Plant in the city of Tomakomai in Hokkaido Prefecture in 1912—the foundational factory for DENKA today.

Dr. Fujiyama was also engaged in developing electric power sources, helping to broaden the industrial base of electrochemical companies powered by hydroelectricity to the Hokuriku and Kyushu regions. Among the competitive advantages that DENKA enjoys today is a business infrastructure in which its electrochemical production is driven by proprietary hydroelectric power generation, and because it can procure lime, a core resource, domestically. These two points are critical in Japan, which is heavily dependent on both energy and materials imports. For example, 57% of DENKA's total electric power usage in FY2009 was generated in-house by hydroelectric means.

DENKA presently commands some 90% of the domestic carbide market. Trias Corporation interviewed IR & Corporate Communications General Manager Tetsu Omachi, regarding DENKA's operations—ranging from its carbide production based on calcinations and electric furnace control technologies to its nitriding expertise involved in the production of lime nitrogen, to research on the organic synthesis of acetylene produced by a carbide-water reaction—and how its know-how has served as the basis in developing products for various client-industries.

\*NOTE: Carbide is the abbreviation of calcium carbide, or CaC<sub>2</sub>. It is produced when a mixture of lime and coke is heated to approx. 2,000 degrees Centigrade in an electric furnace. Lime nitrogen and acetylene gas have various applications in the synthesis of organic chemicals.

## Corporate History and Overview

DENKA, which was the first in Japan to launch lime nitrogen production based on proprietary expertise, opened the Omuta Plant in Fukuoka Prefecture in 1916 and Omi Plant in Niigata Prefecture in 1921 to supplement imports of chemical products that had been tightly rationed with the outbreak of World War I. The Omuta Plant is located by the Ariake Sea, where coal and lime are abundant. It also generated its own electricity until the beginning of World War II. And from the extensive knowledge base accrued over the years, the facility today manufactures fine ceramics, electronic materials and other products as a center for the Company's inorganic chemistry business. The Omi Plant is DENKA's largest production facility. It is supplied by a Mt. Kurohime limestone mine with an estimated deposit of 5 billion tons, which the Company owns exclusive mining rights. The plant is also powered by 110,000 kilowatts of hydroelectricity generated in-house each year, more than 30% of DENKA's annual energy consumption. While mainly producing carbide and acetylene-related inorganic chemical products at this time, it provides cement, special cement additives and organic chemical products as well.

In the 1940s, DENKA moved into the field of organic chemistry synthesis in the effort to effectively use the acetylene that was produced from carbide, and subsequently began to produce acetylene black, acetic acid, acetic acid vinyl and vinyl chloride. The Company then began making a major push into the cement business from 1954. In 1962, DENKA became the first in Japan to commercially produce chloroprene\* rubber based on proprietary technology. Produced by the carbide and acetylene method using the limestone excavated near the Omi Plant, DENKA Chloroprene is now exported to markets worldwide. Also in 1962, the Company opened a plant in a petrochemical complex located in Chiba Prefecture and began producing styrene monomer, polystyrene resin and other petrochemicals. In 1968, DENKA began selling special cement additives, which are produced by integrating cement and chemical technologies, powering the Company today as the largest supplier of the additives in Japan.

DENKA began marketing fused silica, glassy silica, and boron nitride (or BN), products manufactured through high-temperature calcination technology, in the 1970s and have since introduced a host of fine ceramics materials. In 1989, the Company started sales of Spherical Fused Silica, a semiconductor sealant filler that currently commands the largest share of its kind in the world. From the 1980s, DENKA successively introduced a series of heat dissipating materials, which are produced by integrating thermally conductive filler and organic fine technologies. The Company continues to introduce technological innovations in thermal solutions for the electronics industry, which aims high integration and high output of devices.

By integrating organic with inorganic technologies, DENKA moved into such growth markets as electronic materials and, in 1979, by acquiring Toshiba Chemical Co., Ltd.—which would eventually become Denka Seiken Co.—the Company moved into the pharmaceutical business, with the main focus on influenza vaccines. One of four domestic

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\*NOTE: Chloroprene rubber is a type of synthetic rubber produced by chloroprene monomer polymerization. It is superior to natural rubber or other synthetic rubbers in its resistance to climate changes, heat, oil and chemicals. Relatively easy to process, its main applications are auto parts and adhesives.

vaccine providers today, DENKA is currently developing a tissue-cultured process that can produce vaccines in greater volume and in shorter time than the traditional process that relies on embryoed hen eggs. As part of its pharmaceutical effort, DENKA began moving into biotechnology research from the mid-1980s, resulting in the development of an innovative fermentation technique for macromolecular sodium hyaluronate, which it used to make SUVENYL® preparation to improve human joint functions.

In the course of pursuing “the art” of manufacturing for nearly a century in order to maximize the full potential of chemical sciences, while contributing to social benefit in the process, DENKA now operates six factors in Japan, three in Singapore, and one in Suzhou, China. Its five business segments are: organic materials; inorganic materials; electronic products; functional materials and processed products; and other activities.

## Aiming for New Challenges: DENKA 100

In way of celebrating its centennial anniversary in 2015, DENKA has pushed forward DENKA 100, a bold new management initiative, since April 2007. The Company aims to create value from resources by harnessing its advanced technological capabilities and, in so doing, has prioritized the task of “building on its strengths” in such core businesses as DENKA Chloroprene and spherical silica filler, which DENKA commands leading market positions, as well as in such growth fields as electronic materials and macromolecular hyaluronate.

Consider the case of DENKA Chloroprene. Chloroprene rubber was originally developed by the U.S. chemical giant Du Pont in 1932. However, because the Du Pont process required acetylene as a base material and produced a highly explosive byproduct, the challenge of controlled production was extreme. As a result, the butadiene method derived from raw petrochemical materials, developed by B.P. Chemicals in the U.K. in the 1960s, became the mainstream production process. In contrast, DENKA aims to triumph over the global competition by adopting an engineering infrastructure based on the carbide acetylene method which it has refined over the years, a process that does not depend on the naphtha and butadiene commodity markets. DENKA invested ¥24.6 billion in facilities from fiscal 2007 to fiscal 2009, of which ¥20 billion was allocated to increase production capacity of chloroprene rubber by 30,000 tons. As a result, DENKA's chloroprene rubber production capacity stands at 100,000 tons, or roughly 25% of the global market. Demand for DENKA Chloroprene is as follows 40% for automotive components; 20-30% for adhesives; and the remaining for industrial applications; and 60-70% are earmarked for foreign markets. Although the transition to electric vehicles poses a risk over the mid- to long-term future, DENKA plans to fortify its position in the global market by exploiting the world's largest proprietary production infrastructure to the fullest.

An example of DENKA's growth markets success is the  $\beta$ -Sialon phosphor (green) for white LED, which the Company was the first in the world to put to practical use. DENKA began selling the phosphor, which is produced through DENKA's nitride synthesis technique, from October 2009, and sales in fiscal 2009 reached some ¥1 billion.  $\beta$ -Sialon phosphor is an electronic material that was created through three processes that are unique to DENKA: Firstly, it is based on a broad technology base built up through the development of inorganic,

organic and macromolecular products; secondly, it depended on the Company's production technology and expertise applications, as well as its marketing muscle; and thirdly, it was developed in response to client demand, which was identified only as a result of DENKA's.

## FY3/10 Financial Results Summary FY3/11 Earnings Forecast

The Company's financial summary for fiscal 2009 and earnings forecast for fiscal 2010 are shown in Table 1. DENKA projects higher sales from its Electronics Materials business in fiscal 2010, buoyed by earlier than expected sales primarily from LED module phosphor, as well as a recovery in chloroprene rubber sales that had been hit by the appreciating yen from the previous fiscal year. In contrast, sales of cement and building materials are expected to remain flat, while sales of new influenza related products –which were in high demand the previous year–are also believed to become sluggish. With regards to profit, the Company expects such factors as nontransferable cost increases of raw fuel materials and investment to increase production capacity will squeeze profits. The major issues in fiscal 2010 for DENKA will be to improve profitability of its organic and inorganic materials businesses, and to reinforce its chloroprene rubber business in China. ■■

### Consolidated Business Results Summary by Segment

Consolidated (¥billion)	FY3/09		FY3/10 Compositio n		FY3/11 Compositio n		
	Actual	Actual		y/y	Fcst.		y/y
<b>Net Sales</b>	<b>334</b>	<b>323</b>	<b>100.0%</b>	<b>-3.1%</b>	<b>365</b>	<b>100.0%</b>	<b>12.7%</b>
Organic Materials	139	131	40.6%	-5.7%	153	41.9%	16.3%
Inorganic Materials	53	49	15.1%	-7.7%	48	13.3%	-1.0%
Electronic Products	36	39	12.0%	7.1%	51	14.1%	32.1%
Functional Materials and Processed Products	67	71	22.1%	6.2%	75	20.5%	4.9%
Other	37	32	10.1%	-13.2%	37	10.1%	12.8%
<b>Overseas Sales Ratio</b>	<b>23.9%</b>	<b>24.3%</b>		<b>0.4%</b>	<b>26.5%</b>		<b>2.2%</b>
<b>Operating Income</b>	<b>10</b>	<b>21</b>	<b>100.0%</b>	<b>110.7%</b>	<b>25</b>	<b>100.0%</b>	<b>15.2%</b>
Organic Materials	(1)	1	7.8%	-	4	16.0%	135.3%
Inorganic Materials	2	2	10.6%	-8.0%	2	10.0%	8.7%
Electronic Products	3	6	29.5%	113.3%	11	44.0%	71.9%
Functional Materials and Processed Products	6	10	50.2%	75.8%	6	26.0%	-40.4%
Other	0	0	2.8%	20.0%	1	4.0%	66.7%
Elimination	(0)	(0)		-	-		-
<b>Operating Margin</b>	<b>3.0%</b>	<b>6.5%</b>		<b>3.6%</b>	<b>6.8%</b>		<b>0.1%</b>

Source: Prepared by Trias Corporation based on the disclosed data by DENKA.

### Key Financial Data (Consolidated)

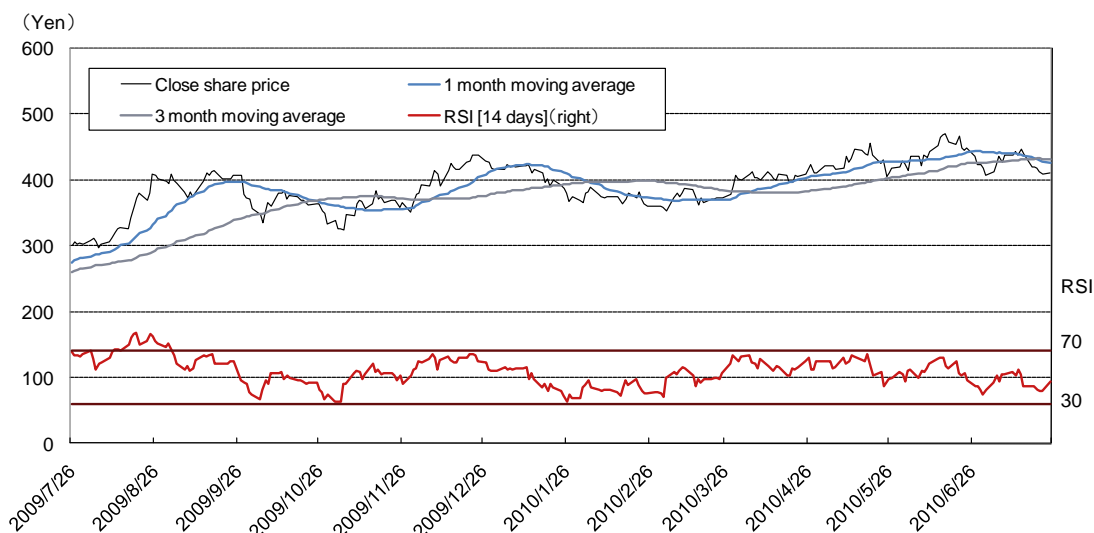
No. of Shares Issued	Mar.10	505,818,645	Total Assets(¥million)	Mar.10	400,407
No. of Treasury Stock	Mar.10	14,861,145	Shareholders' Equity (¥million)	Mar.10	157,824
Market Value(¥million)	26-Jul-10	212,950	Interest-Bearing Debt (¥million)	Mar.10	120,575
BPS(¥)	Mar.10	321.5	Equity Ratio (%)	Mar.10	39.4
ROE (%) ※1	Mar.10	6.9	Ratio of Interest-Bearing Debt (%) ※5	Mar.10	76.4
ROA (%) ※2	Mar.10	2.7	Free Cash Flows (¥million) ※6	Mar.10	18,041
PER(times)	FY12/10 fcst.	14.8	※1 ROE=Current Net Income÷Averaged Shareholders' Equity of beginning of term and term end		
PCFR(times) ※3	Mar.10	6.8	※2 ROA=Current Net Income÷Averaged Total Assets of beginning of term and term end		
PBR(times)	Mar.10	1.3	※3 PCFR=Market Value÷(Current Net Income+Depreciation)		
Share Price (¥)	26-Jul-10	421	※4 Average Daily Volume=Ave. Daily Vol. for previous 12months		
Unit Share (shares)	26-Jul-10	1,000	※5 Ratio of Interest-Bearing Debt=Interest-Bearing Debts÷Equity		
Average Daily Volume (shares) ※4	26-Jul-10	6,875,426	※6 Free Cash Flows=Operating CF+Investment CF		

### Business Results (Consolidated)

	Consolidated (¥million)	Operating Net Sales	Operating Income	Ordinary Income	Ordinary Net Income	EPS(¥)	Dividend per Share (¥)
FY3/07	329,262	29,877	26,006	15,734	32.03	8.00	
FY3/08	363,996	29,912	24,918	6,660	13.57	10.00	
FY3/09	334,130	10,302	3,094	1,439	2.89	7.00	
FY3/10	323,875	21,655	16,888	10,474	21.33	8.00	
Q2 (Cumulative) FY3/11 fcst.	177,000	12,000	11,000	6,500	13.24	5.00	
FY3/11 fcst.	365,000	25,000	22,500	14,000	28.51	5.00	

Note: FY3/11 forecasts announced on May 7, 2010

### Share Price Charts and RSI



Note: RSI, Relative Strength Index, is the index representing the ratio of overbought or oversold share prices.  
In general, over 70 in RSI shows overbought share price range, while below 30 shows oversold share price range.  
RSI=averaged share price appreciation for N days ÷ (averaged share price appreciation for N days+averaged share price decline for N days) × 100

Source: Prepared by Trias Corp. with Bloomberg L.P. data.