NIPPON SHOKUBAI CO., LTD.
COMPANY PROFILE

Osaka Office
Kogin Bldg.,
6-1-1 Koshikishii, Chuo-ku,
Osaka 541-0043, Japan
TEL +81-6-6223-9111
FAX +81-6-6201-3716

Tokyo Office
Hibiya Dai Bldg.,
1-2-2 Uchisaiwai-cho, Chiyoda-ku,
Tokyo 100-0011, Japan
TEL +81-3-3506-7475
FAX +81-3-3506-7598
http://www.shokubai.co.jp/en/
Providing affluence and comfort to people and society,
with our unique technology

Corporate Credo

Safety takes priority over production.

We conduct all of our corporate activities based upon a deep
respect for humanity.

We aim at coexisting with society, and working in harmony with the environment.

We pursue technologies that will create the future.

We act on the global stage.

We are deeply dedicated to humanity and the innate human values of sincerity and honesty. We respect the unique traits and worldview of each individual, embracing diversity and working to promote mutual understanding and trust. We recognize that it is the human spirit and point of view that shape our understanding of management and our actions. A deep respect for humanity is the foundation for all of our corporate activities.

We work to create sustainable societies. We believe it is our corporate social responsibility to develop positive relationships with all of our stakeholders, as well as with the global environment.

We deliver new value that benefits people and society and are dedicated to working as a unified team to develop technology that will open the door to the future.

By working to expand our business worldwide, we aim to realize our TechnoAmenity mission of “providing affluence and comfort to people and society,” around the world.

Our company logo represents the spirit of TechnoAmenity:

- Hexagon: One of the fundamental symbols used in chemistry
- Cosmo yellow: Represents the hidden energy of the sun
- Earth green: Represents the life-supporting nature of the earth
- Horizon between two colors: Represents the future we always seek
We deploy our unique technologies to provide optimal solutions for the customers we partner with.

Our catalytic technology has an outstanding reputation in Japan and around the world. We deploy this expertise to create unique technologies in many business fields. We partner with companies and institutions and demonstrate our technological capabilities with optimal solutions that address their wide-ranging requirements.

Hand in hand with customers, deliver value worldwide make people’s lives more we give shape to ideas and to resolve social issues and affluent and comfortable.

TechnoAmenity
Providing affluence people and society, with and comfort to our unique technology

We partner with customers to give shape to their technological ideas that resolve challenges.

Customers

Solutions

Needs

- Reduce energy use and efficiently store energy
- Create new businesses
- Increase production efficiency
- Reduce environmental impact
- Improve quality
- Enhance performance

Other challenges

Reduce

Create

Other

Inorganic synthesis and catalyst technology
Organic synthesis technology
Polymer synthesis technology
Research and development
Marketing
Production technology
Together with customers, we help resolve social issues by giving shape to ideas.

Alternative energy, infrastructure and environmental protection are among the diverse array of challenges for the future that today’s global society must address. Together with customers, we give shape to ideas to resolve social issues and make people’s lives more affluent and comfortable.

### Energy

Our high-performance materials enable batteries that help to resolve energy issues.

- Ensuring universal access to safe, reliable energy services
- Expanding the renewable share of energy
- Applied proprietary synthesis and purification technology to pioneer mass-production technology for a new electrolyte for lithium-ion batteries
- Furthered the uptake of safe, high-performance batteries by improving the characteristics of rechargeable lithium-ion batteries

- Electrolyte for lithium-ion batteries “LIFSI” [IONEL™]

### Safety

Our technologies enable strong and durable concrete for buildings where people can live in safety.

- Expanding infrastructure and improving safety
- Improving the resilience of urban and residential areas against natural disasters
- Developed and commercialized proprietary polycarboxylate acid-based polymers for concrete admixture that enable high-strength, high-fluidity concrete
- Improved building durability while reducing labor requirements through technologies for stronger, more fluid concrete
- Facilitated building engineering and design

- Polymers for concrete admixture [AQUALOC™]

### Clean

By efficiently removing harmful substances in wastewater, we help resolve water issues worldwide.

- Achieving highly economical wastewater treatment
- Reducing water pollution and minimizing the release of harmful substances into the environment
- Achieved integrated production of high-quality polyethyleneimine from raw materials using a proprietary method that emits low amounts of waste
- Leveraged high amino adhesion and reactivity to supply polyethyleneimine as a raw material for heavy metal treatment agents, thus helping to detoxify industrial wastewater

- Polyethyleneimine [EPOMIN™]

### Greening

We leverage the water absorbency of superabsorbent polymers in the development of technology for preventing desertification.

- Preventing deforestation; increasing afforestation and reforestation
- Improving soil quality in areas affected by desertification and drought
- Developed materials suitable for improving the water retention of soil by applying technology used in materials for disposable diapers
- Developed materials suitable for improving the water retention of soil by applying technology used in materials for disposable diapers
- Promoted afforestation in desertifying areas with soil additives that promote plant growth

- Water-retention agent for horticulture [ACRYHOPE™]

---

0605
Numerous chemical industry firsts in Japan and worldwide are testimony to our history of success in evolving our R&D and production technology capabilities. We are an innovative chemical company that leverages new and existing core technologies to provide customer solutions.

**First Commercial Production of Phthalic Anhydride**

Developing a proprietary method to oxidize naphthalene using a vanadium catalyst, we were the first in Japan to commercially produce phthalic anhydride. Initially, demand for this product increased as a raw material for aircraft paints and plastics. Later, this key plasticizer for vinyl chloride products contributed to the growth of the vinyl chloride industry. Home-grown technology underpins our operations as a chemical manufacturing company.

**Successful Ethylene Oxide Production**

In the 1950s, many Japanese petrochemical companies were reliant on imported technologies. We changed that by using our own catalytic oxidation technology to commercialize ethylene oxide. This contributed significantly to the development of the domestic petrochemical industry, and ethylene oxide applications now range from polyester raw materials and construction products to detergent raw materials.

• In Japan, we are a leading producer by volume.

**A New Acrylic Acid Production Process**

We were the first in the world to commercialize acrylic acid through direct oxidation of propylene. This enabled low-cost, high-volume acrylic acid production and derivative products including paint raw materials, adhesive raw materials and superabsorbent polymers. Leading acrylic acid manufacturers worldwide have adopted our production technology and catalysts.

• We are one of the largest volume producers worldwide.

**Successful Mass-Production of Superabsorbent Polymers**

We began mass-producing AQUALIC™ CA, known as superabsorbent polymers, in 1985 using acrylic acid as a raw material, and we continue to be the global technology and production leader in this market. Our superabsorbent polymers have excellent water absorption and retention of 100 to 1,000 grams of water per gram of polymer. Mainly used in disposable diapers, our superabsorbents improve quality of life and have also served to prevent desertification.

• We are the top producer (as of April 2019, according to Nippon Shokubai research) in the global superabsorbents market and operate a worldwide production system.

**ACRYVIEWA™ Commercial Production**

We used new polymer design technology to successfully commercialize ACRYVIEWA™, a unique acrylic resin with outstanding transparency, optical properties, and heat resistance. This high-performance material enables larger, thinner liquid crystal displays for televisions, smartphones, tablets and other devices.

**IONEL™ Mass-Production Technology**

We devised the mass-production technology for IONEL™ using proprietary synthesis and refining techniques. IONEL™ is an electrolyte for lithium-ion batteries that effectively improves cycle life, charge/discharge performance and low-temperature performance, and reduces cell bulging at high temperature. Also used in automotive battery applications, we expect this product to be a driver of future growth.
A Message from the President

We will focus on technology in targeting major progress toward our Vision for 2025.

Second president and key founding figure of the Nippon Shokubai Group, Taizo Yatagai, espoused the importance of technology-driven management. True to that legacy, we contribute to society based on our Group Mission: “Providing affluence and comfort to people and society, with our unique technology.” Moreover, as expressed in our Corporate Credo, “Safety takes priority over production,” safe and reliable operations remain the cornerstone of our management. To foster even greater public trust as a chemical company, we link all of our corporate activities to the UN’s sustainable development goals (SDGs) and actively carry out initiatives to honor our corporate social responsibility.

Primarily serving corporate customers, the Nippon Shokubai Group provides chemical products that create value in diverse industries. Working largely behind the scenes, we nonetheless support many industries and thus an affluent, comfortable society. You can rest assured that we will continue to do so by leveraging our extensive portfolio of technologies and our ability to develop new ones.

Our Vision for 2025 is to be “an innovative chemical company that provides new value for people’s lives.” It guides us in fulfilling our mission as we evolve in anticipation of a new era of change and growth.

We are also executing Reborn Nippon Shokubai 2020 NEXT, our medium-term business plan for the four years from fiscal 2017 through fiscal 2020. Sound growth is the key to achieving the goals of the plan. We are therefore concentrating on strengthening existing businesses while taking on the challenge of sustainable growth in new fields where we can leverage our strengths, including life sciences, energy and environment, and ICT.

The Nippon Shokubai Group will vigorously pursue its Group Mission by accurately identifying the needs of society and meeting them quickly with new products and services. As we do so, we look forward to your continued understanding and support.

Yujiro Goto
President
Leveraging our proprietary technologies, we have developed wastewater treatment catalysts for catalytic wet air oxidation (CWAO). These solid catalysts purify wastewater by oxidizing and decomposing harmful substances. Our catalysts efficiently treat highly toxic wastewater in chemical plants, do not generate secondary pollutants such as sludge or air pollutants, and result in reusable treated water. In addition, our catalysts reduce operating costs as they require less space and energy than processing methods that use microorganisms or incineration. We expect increasing usage in Southeast Asia and other overseas markets.

Secondary Alcohol Ethoxylates: SOFTANOL™

Nippon Shokubai has commercialized secondary alcohol ethoxylates under the SOFTANOL™ brand through the use of proprietary technologies. The outstanding properties of these surfactants include excellent detergency even at low temperatures, excellent wetting power, unique foam properties, and ease of handling due to low viscosity and low pour points. Ideal applications include fabric and dishwashing liquid detergents, textile scouring agents, pulp and paper agents, and hard surface cleaners. Featuring high biodegradability and low persistence in the environment, SOFTANOL™ has built a solid reputation from the perspectives of environmental sustainability and preventing water pollution.

Our products help to prevent and counteract environmental degradation. They include automobile exhaust emission treatment catalysts that employ proprietary catalytic technology, and products for denitrification, decomposition and removal of dioxins, and wastewater treatment. Nippon Shokubai taps into its extensive range of technologies and catalyst production data to swiftly address customer needs with the optimum catalysts.
Our energy and resources business helps society remain affluent and comfortable by supporting environmentally friendly mobility, with products ranging from electrolytes that enable the manufacture of high-performance batteries for electric vehicles, to materials for paints and adhesives. We also focus on energy conversion products including materials for solid oxide fuel cells (SOFC), and on water products including materials for water treatment agents.

Energy Sheets for Solid Oxide Fuel Cell (SOFC)
The world is looking to fuel cells for their ability to generate power efficiently and their environmental friendliness. We developed a proprietary electrolyte sheet that can serve as a key component of such cells. Made of a strontium-based ceramic, it offers great mechanical strength, planarity and dimensional accuracy. Overcoming a variety of challenges through the full use of our inorganic catalyst forming technology and organic material synthesis technology, we achieved mass production of high-quality electrolyte sheets. Looking forward, energy and environment technologies will play an increasingly important role in the realization of a low-carbon society.

Technology Close-Up

- Fine particles for semiconductor sealing (SEAHOSTAR™)
- Film adhesion promoters (EPICORO™)
- Resin polymers for color filters (ACRIPURE™)

Monomer for UV/EB Curable Materials: AOMA™
The market for ultraviolet- and electron-beam-curable materials that do not entail the use of solvents is expanding because of stronger regulation of volatile organic compounds and increased emphasis on environmental protection. Nippon Shokubai used its proprietary molecular design technology to develop the functional monomer AOMA™, a diluent for UV/EB-curable materials that enables the formation of coating films that are hard yet flexible, and has excellent adhesion to various substrates such as glass, metals and plastics. We expect these characteristics to support its use in applications including UV inkjet ink and materials for flexible devices.

Technology Close-Up

- Industrial inkjet ink (AOMA™)

Electrolyte for fuel cells (IONEL™)

- Fine particles for semiconductor sealing (SEAHOSTAR™)
- Film adhesion promoters (EPICORO™)
- Resin polymers for color filters (ACRIPURE™)

Our life sciences business supports human health, beauty and quality of life. We provide startup support in pharmaceutical and healthcare markets, and new value in cosmetics markets by providing unique material and chemical technologies.

Drug Development Support Business
In the pharmaceutical industry, there exists a gulf between successful laboratory research and marketable products. Obstacles range from complex legal and regulatory issues to the large time and investment required. We have formed alliances with and invested in promising biotechnology companies including GlyTech, Inc., TKM-Circulator Corporation, and Rena Therapeutics Inc. in the fields of peptide drugs, nucleic acid drugs and drug delivery systems (DDS). Nippon Shokubai’s manufacturing technologies, and research and development capabilities, coupled with our partners’ expertise in drug discovery technologies, enable customers to overcome the challenges of commercialization and benefit healthcare and society.

Collaboration with Manufacturer of Natural Ingredients for Cosmetics
Nippon Shokubai promotes the cosmetic ingredient business through partnerships including M&A, as well as through the application of our technologies and expertise in catalysis, polymer synthesis and organic synthesis, we will establish the synthesis of APIs and APIs for clinical trial drugs under contract as a cornerstone of our drug development support business.

Middle molecule: A term for compounds between small molecules and macromolecules such as antibodies. Nucleic acids and peptides fall into this category.
Our Products

We explore new avenues while nurturing our existing technology portfolio, and our product lineup spans basic chemicals, functional chemicals, and the environment & catalysts. All of our products, from catalysts used in factories, to materials for disposable diapers, help in making society more affluent and comfortable.

### Basic Chemicals
- Ethylene Oxide & Derivatives Sales
  - Ethylene oxide
  - Ethylene glycol
  - Ethanolamines
  - Secondary alcohol ethoxylates (SOFTANOL™)
- Acrylic Acid & Esters Sales
  - Acrylic acid
  - Acrylates

### Functional Chemicals
- Water Soluble Polymers Sales & Marketing
  - Polymers for concrete admixture (AQUALOC™)
  - Water-soluble polymers (AQUALIC™)
- Resins for paints and adhesives (ACRYSET™)
- N-Vinyl pyrrolidone
- Polyvinyl pyrrolidone

### Environment & Catalysts
- Specialty Acrylics Sales & Marketing
  - Specialty acrylates
  - Specialty methacrylates
- E&I Materials Sales & Marketing
  - Acrylic resins for optical films (ACRYVIEWA™)
  - Spherical fine particles
  - Resin particles (EPOSTAR™)
  - Polymers for printed wiring boards (EPOCEL™)
- Specialty Acrylics Sales
  - Superabsorbents Sales
  - Superabsorbent polymers (AQUALIC™ CA)
  - Sulfonate water-absorbent polymers (AQUALIC™ CS)
  - Water-retention agent for horticulture (ACRYHOPE™)
- Performance Polymers Sales & Marketing
  - Ultra weatherability resins (UWR™)
  - Resins for paints and adhesives (ACRYSET™)
  - N-Vinyl pyrrolidone
  - Polystyrene pyrrolidone

Research and Development, and Production Technology

Nippon Shokubai has eight research divisions spread across two research centers in Japan that strengthen existing businesses and create new businesses. While seeking to develop innovative production technologies, we fulfill our Corporate Credo of “Safety takes priority over production” and maintain consistently high quality at each facility.

### Research and Development
We contribute to society by creating innovative technologies to provide products that offer outstanding user value.

#### Basic Research and Development Policy
- Business division research: Develop existing products and technologies based on business strategy; Create new businesses in growth markets based on company-wide strategy.
- Corporate research: Create new businesses with a medium-to-long-term perspective.
- Improve speed of commercialization through means including open innovation.

About 500 of our employees are involved in research, accounting for 25 percent of all employees. They carry out world-class research and development. Through an organizational framework that innovates with a focus of market- and industry-driven business development, we timely create relevant products and services that are in demand from society.

#### Production Technology
During commercialization, research and manufacturing departments collaborate to scale up to mass production and plan the safest, most efficient manufacturing processes. A track record of designing and building our own plants since the Company’s establishment has given us accumulated expertise in production technology and engineering. Consequently, our production technology boasts world-class output stability and efficiency that ensures we can respond precisely to market needs with timely mass production.

### Open Innovation
It has become crucial for businesses to collaborate by solving social issues and delivering customer value. We therefore strategically and proactively employ an open innovation model that seeks to secure differentiated technologies and accelerate commercialization through alliances and collaboration with organizations in and outside Japan, including universities, research institutions, and startups. We also partner with venture capital firms, operate the Nippon Shokubai Research Alliance Laboratories with Osaka University, and are conducting joint research with Nanyang Technological University in Singapore that has enhanced our overseas R&D network.

### SpotLight
Nippon Shokubai employees assigned to overseas R&D

Nanyang Technological University, Singapore
The Nippon Shokubai Group encompasses companies with expertise in businesses ranging from general chemistry to processing, transport, and trading. We leverage synergies within our network to quickly and accurately address customer requirements. Furthermore, we address increasing demand outside Japan with a global production and distribution network.

International Locations

- NIPPON SHOKUBAI EUROPE N.V.
  - Umicore Shokubai S.A.
  - Established: February 1999
  - Products: Acrylic acid
  - Superabsorbent polymers

- PT. NIPPON SHOKUBAI INDONESIA
  - Jakarta, Indonesia
  - Established: August 1996
  - Products: Acrylic acid
  - Acrylates
  - Superabsorbent polymers

- SINGAPORE ACRYLIC PTE LTD
  - Established: July 1996
  - Products: Acrylic acid
  - Glacial acrylic acid

- OGNIK SHOKUBAI (ASIA) PTE. LTD.
  - Established: January 1998
  - Products: Glacial acrylic acid

- PT. NIPPON SHOKUBAI INDONESIA
  - Cilegon, Banten, Indonesia
  - Established: August 1996
  - Products: Superabsorbent polymers

- NISSHOKU CHEMICAL INDUSTRY (ZHANGJIAGANG) CO., LTD.
  - Zhangjiagang, Jiangsu, China
  - Established: April 2003
  - Products: Superabsorbent polymers
  - Polymers for concrete admixture

- SINO-JAPAN CHEMICAL CO., LTD.
  - Taipei; Kaohsiung, Taiwan
  - Established: May 1970
  - Products: Surfactants and other organic chemicals

- American Acryl L.P.
  - Established: December 1997
  - Products: Acrylic acid

- Nippon Shokubai America Industries, Inc.
  - Established: January 1988
  - Products: Superabsorbent polymers
  - Acrylic acid polymers

- Nippon Shokubai America
  - Industries, Inc.
  - American Acryl L.P.
  - American Acryl NA, LLC.

- NIPPON SHOKUBAI EUROPE N.V.
  - Zwijndrecht, Belgium
  - Established: February 1999
  - Products: Acrylic acid
  - Superabsorbent polymers

- NISSHOKU CHEMICAL INDUSTRY (ZHANGJIAGANG) CO., LTD.
  - Zhangjiagang, Jiangsu, China
  - Established: April 2003
  - Products: Superabsorbent polymers
  - Polymers for concrete admixture

The Himeji Plant occupies a site of 900,000 square meters. As our primary plant, it researches and manufactures a wide range of products for core businesses including acrylic acid and superabsorbent polymers.

The Kawasaki Plant comprises the Chidori Plant and the Ukishima Plant. Here, we were first in Japan to commercialize ethylene oxide, and today this plant is home to one of Japan’s largest production facilities for ethylene oxide and its derivative products.
Corporate History

Established as Osamu Gosei Kagaku Kogyo Co., Ltd. Opened Suita Plant
Company renamed Nippon Shokubai Kagaku Kogyo Co., Ltd. Listed on the first section of the Osaka Securities Exchange
Opened Himeji Factory (currently Himeji Plant)

Our History of Technological Innovation

1948
First in Japan to commercially produce phthalic anhydride

1955
Successfully mass-produced tricarboxylic acid through biochemical fermentation

1957
Used proprietary technology to commercially produce unhydrolyzed polyester resin for the first time in Japan

1960
Produced electrolyte for rechargeable lithium-ion batteries

1982
Developed and commercialized lactone-ring-containing acrylic polymer for optical films

1991
Developed and commercialized a new production process for maleimides

2003
Received the Kikaihakken Chemical Engineering Achievement Award for Ni-Violin-generate production technology

2009
Received the Okitsu Memorial Prize for developing new dioxygenation production technology

2014
Received the Chemical Society of Japan Award for Technical Development for developing and commercializing lactone-ring-containing acrylic polymer for optical fibers

Commercialized electrodes for rechargeable lithium-ion batteries

Overseas Subsidiaries & Affiliates

Nippon Shokubai America Inc., Inc. (日触合成化學美國股份有限公司)

6631 Old Highway 146, Suite A, Pasadena, TX 77507, USA
TEL: +1-832-284-4033

SINO-JAPAN CHEMICAL CO., LTD. (中日合成化學有限公司)

1610, 95, Sec. 2, Jen Ai Rd., Taipei 10621, Taiwan
TEL: +886-2-2366-1223
FAX: +886-2-2361-6428

American Acrylic L.P.

6631 Old Highway 146, Suite B, Pasadena, TX 77507, USA
TEL: +1-832-284-4033

American Acrylic NA, LLC

3F Busan Bldg., 1-4-1 Naichi Shinbashi, Minato-ku, Tokyo 105-0023, Japan
TEL: +81-3-5651-3002
FAX: +81-3-5651-3090

Imucore Shokubai Co., Ltd.

23-17 Ninokuchicho, Tokorozawa
TEL: +81-3-5678-7656
FAX: +81-3-5678-7678

To convert the text into a plain text format, please refer to the content above.
Corporate DNA Inspired by “The Passionate Entrepreneur”

Nippon Shokubai has been growing for more than 70 years. Carrying on the spirit of taking on visionary challenges that has been passed down by our second president, Taizo Yatagai, known as “the passionate entrepreneur,” we have created unprecedented value using technologies that no other company possesses. The cornerstone of our success is Taizo Yatagai’s decision to expand into the petrochemical industry. Eschewing the technologies of U.S. forerunners, Nippon Shokubai pursued research and development focused on its proprietary technologies. These efforts bore fruit in 1959 when the Kawasaki Plant became the first in Japan to commercially produce ethylene oxide using home-grown technology.

(The early years of Nippon Shokubai: Taizo Yatagai features by name as the protagonist of Hono-o no Keieisha (The Passionate Entrepreneur), a novel by Ryo Takasugi based on Yatagai’s business experiences.)

Contemporary lifestyles and the issues faced by society continue to grow increasingly sophisticated and complex. We have answered these developments with one innovative product after another. The basic materials that we manufacture also become the building blocks for higher-added-value products.