

Science and Technology

We shall advance R&D by bringing together outstanding researchers from Japan and overseas, and contribute to the realization of *KAITEKI* through innovation. We shall recognize the importance of our own and others' intellectual property rights and respect such rights.

Creating Innovation

Approach to Creating Innovation

Today, as life cycles for products and services are getting shorter it is becoming more difficult to create highly competitive innovation from unique technologies and services. In order to create innovation at the speed that is now demanded, it is necessary for the MCHC group to integrate processes, products, and systems for technologies and services.

Examples of Initiatives for Fostering Innovation and Their Results

Based on this approach, the MCHC Group is increasing synergies between its four core operating companies and emphasizing the forming of wide-ranging and flexible partnerships with outside entities.

With open innovation and our concept of "open shared business" as key phrases, through collaboration with a variety of industries and government institutions, as well as academia, we aim to continue creating highly competitive innovation.

Examples of Partnerships with Industries, Academia, and Governments

- In June 2012, the research results for a composite material development project*1 at NEDO*2 in which Mitsubishi Rayon is participating received a JEC*3 Innovation Award 2012 in the Automotive category. In this project, we are developing the new composite material carbon fiber reinforced thermoplastics (CFRTP) with the aim of making mass-produced cars lighter.

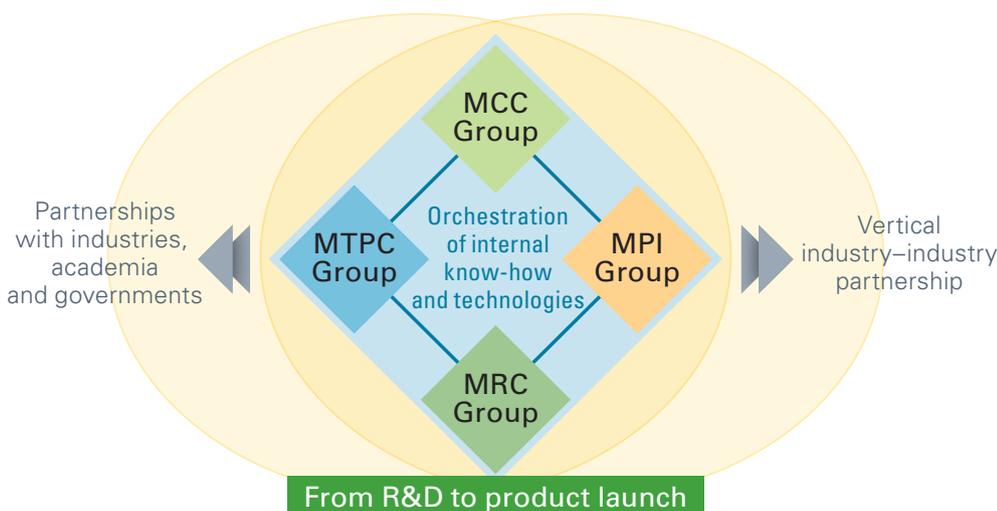
*1. "Development of Sustainable Hyper Composite Technology" Project leader: Professor Jun Takahashi, Tokyo University; Participating companies: Toray Industries, Mitsubishi Rayon, Toyobo, and Takagi Seiko

*2. NEDO: New Energy and Industrial Technology Development Organization

*3. JEC: Journals and Exhibitions on Composites, the sponsor of the world's largest composites show, which is held to promote composite molding technologies (Head office in Paris)

- In November 2012, the Japan Technological Research Association of Artificial Photosynthetic Chemical Process (ARPCChem) started with the participation of Mitsubishi Chemical and the Artificial Photosynthesis Project was launched. This is a Future Pioneering Project in partnership with the Ministry of Economy, Trade and Industry (METI) and the Ministry of Education, Culture, Sports, Science and Technology (MEXT), and its aim is to achieve a 10% level of energy conversion efficiency—the rate at which the manufacturing of raw materials for chemicals becomes economically viable—through a process in which solar power would dissolve water.
- Mitsubishi Tanabe Pharma has set up an industry-academia joint research course at Nagoya University, making use of the academic research environment and cultivating researchers at the same time as targeting breakthrough creation of innovative new drugs from drug discovery targets.

MCHC Group's Open Innovation



Examples of Industry–Industry Partnerships

- Mitsubishi Chemical, through joint research with Pioneer Corporation, has produced long-life (57,000 hours) and highly efficient (56 lm/W) organic light emitting diode (OLED) lighting panels using the wet coating process. Taking this research to the next stage, both companies have set up a testing facility with the aim of developing mass production technologies.
- Mitsubishi Chemical and the French company Faurecia are conducting joint R&D to pursue the development of the bio-mass polybutylene succinate (PBS) that is suitable for automotive interior parts by 2014.
- Mitsubishi Plastics in cooperation with Sunray developed the world’s longest chromed surface carbon roller (9.2-meters) using pitch-based carbon fiber. Roller users such as film and paper manufacturers can significantly improve their productivity by using this product.
- Mitsubishi Chemical, through joint research with Oji Holdings Corporation, manufactured the world’s first ultrathin 4-nanometer transparent continuous sheets using cellulose fibers. The sheets are expected to be used for large displays and photovoltaic (PV) modules.
- In October 2012, MCHC joined the general incorporated association, the Forum for Innovative Regenerative Medicine. This forum comprises mainly corporations in the fields of pharmaceuticals, materials and components, equipment, and insurance and was incorporated to quickly establish social systems to ensure safe and stable access to the benefits of research into regenerative medicine. It seeks not only to complete cures for the illnesses that many medical patients suffer from but also strives to safeguard the national interest, contribute to international society, and pave the way for the commercialization of new regenerative medicine techniques with the purpose of building a social consensus on their application.

Example of Investment in Venture Funds

MCHC invests in clean technology venture funds in such areas as next-generation energy, energy conservation, renewable resources, and environmental technologies.

Through these funds, we are strengthening existing companies as well as creating new businesses.

Use of Public Programs and Certification Programs

In fiscal 2012, the MCHC Group received a total of ¥843 million as trust money, subsidies, and other forms of financial support for R&D from national and local governments. This includes a total of ¥652 million from NEDO for projects aiming to establish sustainable technologies (including green sustainable chemical processes, high-efficiency lighting, and organic photovoltaic (OPV) modules).

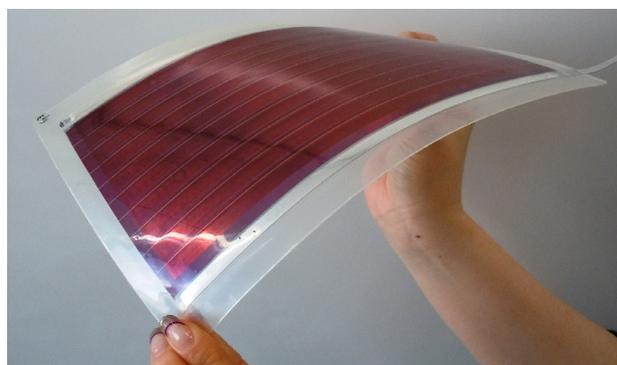
We have established pilot facilities targeting mass production of OPV modules and are implementing trial production using roll-to-roll (R2R) processing, which makes it possible to supply low-cost products. In regard to high-efficiency lighting, with a view to reduce the cost of LED lighting, we have successfully tested mass production using a new process for gallium nitride (GaN) substrates, a material used in lighting, and expect to begin mass production in the second half of fiscal 2013.

Respect for Intellectual Property

When the MCHC Group discovers new technologies, products, or services, it protects that value legally by gaining intellectual property (IP) rights through patenting or other methods. We take appropriate measures when our IP rights are infringed by other parties. At the same time, we respect the valid IP rights of other parties, performing sufficient preliminary surveys to ensure we do not infringe any rights and pursue initiatives such as developing substitute technologies or technological workarounds so that we do not use the IP in question or we acquire usage rights from the other party.

We also target expansion of operating revenue in the MCHC Group as a whole, furthering IP synergies between Group companies by strengthening competitiveness and increasing R&D productivity as a result of the leveraging of IP between Group companies. At the same time, by utilizing each Group company’s IP in mutually complementary ways, we aim to maintain the value of IP throughout the Group and to assert and protect our rights against third parties.

Activities at Operating Companies → [MCC](#) → [MTPC](#)



OPV module