Press Conference

President of JST

July 23, 2014

Japan Science and Technology Agency

Strategic Basic Research Programs

Advanced Low Carbon Technology Research and Development Program（ALCA）

Creating advanced technologies devoted to realizing the creation of a worldwide low carbon society

In order to promote lower greenhouse gas emissions in the mid-long term on a continuous, steady basis, ALCA is aimed at promoting R&D of technologies with great potentials to reduce greenhouse gas emissions based on new S&T knowledge in a competitive environment, and achieving results of R&D that lead to creating green innovation.

Creating "game-changing technologies" that can completely alter preconceived ideas

Aspiring to achieve a breakthrough by discovering and developing unknown scientific principles and concepts in technology

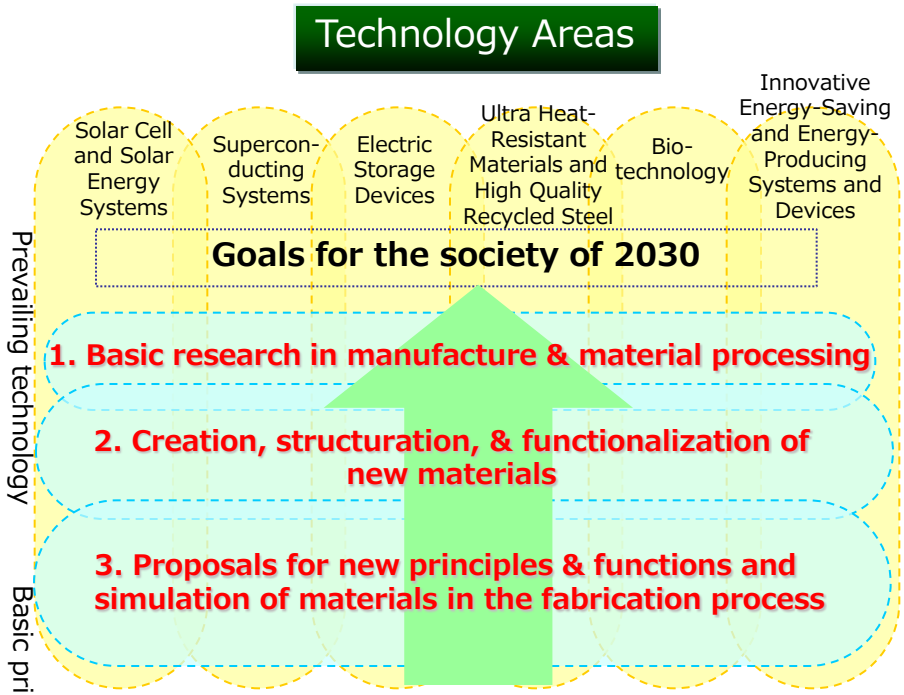
Characteristics

- ○ Challenging R&D
- ○ Transdisciplinary R&D; integration of researchers among different fields
- ○ Comprehensive R&D extending from basic research to development
- ○ Research period extension
- ○ Resolution of specific issues from a long-term perspective
- ○ Introduction of the "stage-gate evaluation" method
- ○ Proactive addition of new subjects to address
- ○ Encouraging the application of research results

R&D period and costs

- ◆ Period: 10 years at the longest (initially scheduled for two to five years)
  (Conducting a rigid evaluation, which is referred to as "stage-gate evaluations," every one to three years)
- ◆ Costs: approx. 30 million yen per year

Technology Areas



Budget for FY2014: 5,715 million yen
(Budget for FY2013: 7,345 million yen)

ALCA's Program Director and Program Officers

Conducting proactive management by selecting & evaluating R&D projects and understanding & following the progress state of the projects

Program Director

Kazuhito Hashimoto
Professor, The University of Tokyo

ALCA Promotion Committee

- ○Selecting technology areas for calls for proposals and project candidates
- ○Managing a total budget of R&D costs
- ○Deciding on whether or not R&D should be continued based on stage-gate evaluations; linking or integrating R&D projects, and so on

Program Officers	Technology Areas
 Makoto Konagai, Professor, Tokyo Institute of Technology	Solar Cell and Solar Energy Systems
 Hiroyuki Ohsaki, Professor, The University of Tokyo	Superconducting Systems
 Tetsuya Osaka, Professor, Waseda University	Electric Storage Devices
 Yoshinao Mishima, President, Tokyo Institute of Technology	Ultra Heat-Resistant Materials and High Quality Recycled Steel
 Akihiko Kondo, Professor, Kobe University	Biotechnology
 Takashi Tatsumi, Executive Vice President, Tokyo Institute of Technology	Innovative Energy-Saving and Energy-Producing Chemical Processes
 Kenji Taniguchi, President, Nara National College of Technology	Innovative Energy-Saving and Energy-Producing Systems and Devices
Prioritized Technology Areas	
 Kohei Uosaki, Principal Investigator, National Institute for Materials Science	Next Generation Rechargeable Battery

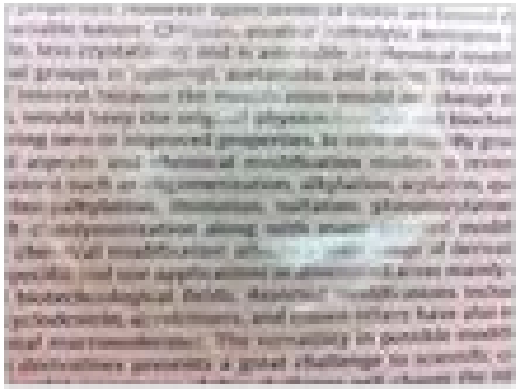
*"Energy Carrier" in the prioritized technology areas has been moved to SIP program.

ALCA's Research Result 1

Over 390°C, Bioplastics with the Highest Thermoresistance Temperature

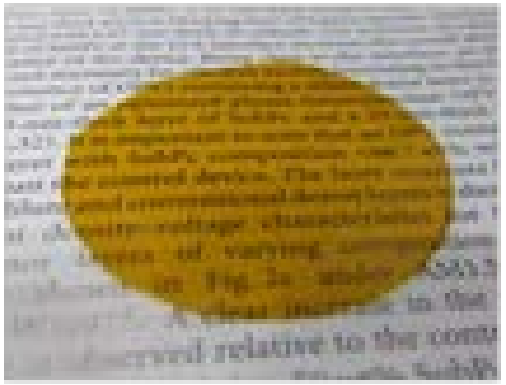
Tatsuo Kaneko, Professor, Associate Professor, School of Materials Science, Japan Advanced Institute of Science and Technology (JAIST)

Transparent



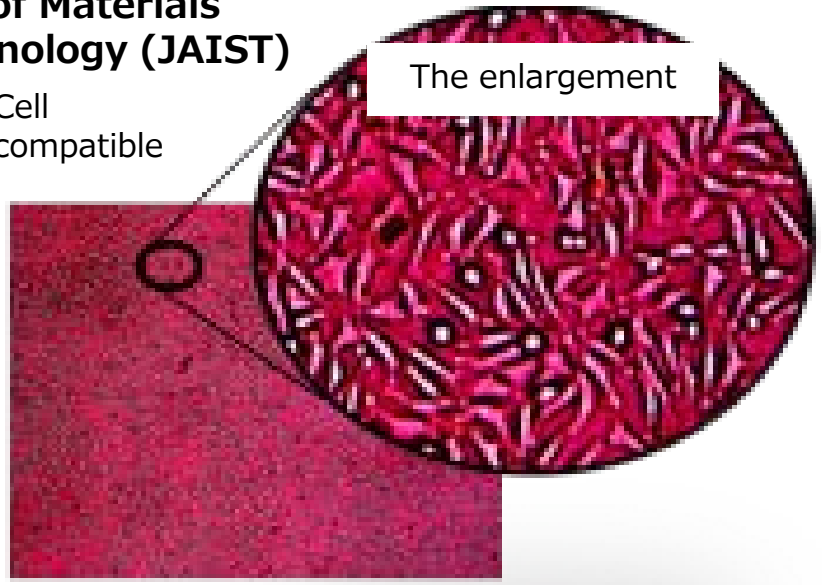
Bio-based polyimides that were developed in this research

Brown



Conventional polyimides derived from petroleum

Cell compatible



Fibroblasts extending well on biopolyimide films

(Press-showed on Feb. 14, 2014)

Biopolyimides on transparent resin showed the highest thermal resistance!

- Having a high performance of transparency, low-thermal expansion, and so forth
- Expected as an alternative material for glass or metal that is used for electrical parts, automotive parts, and so forth

Potential as a material for artificial crystal lenses, which are more flexible than those made of glass

ALCA's Research Result 2

Development of multi-purpose insulation materials that can realize a significant saving of energy

Kazuki Nakanishi, Associate Professor, Kyoto University

A glass-wool polymer form

<40 mW/m·K

Aerogels

Thermal conductivity <10 mW/m·K

- **Housings**
- **Automobiles**
- **Home electrical appliances**

Development of super high-performance insulation materials

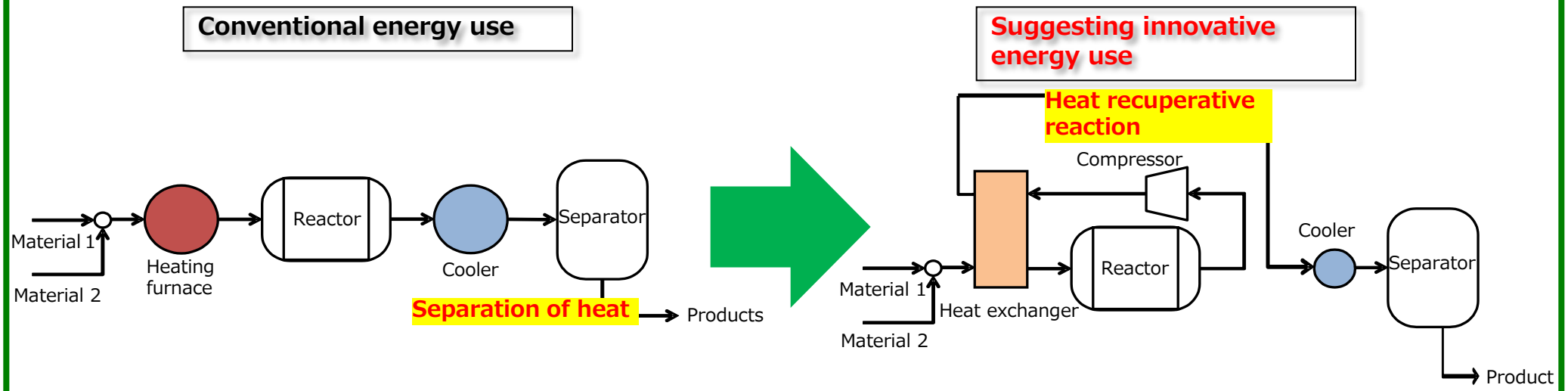
- In order to realize the saving of energy in manufacturing industrial products including houses through the spread of a variety of insulation materials, we have promoted the development of super high-performance insulation materials by use of the new organic-inorganic hybrid aerogel (PMSQ aerogel) that has an outstanding functionality, strength, durability, and flexibility.

More effective insulation → Extra efficient insulation, low carbon society

ALCA's Research Result 3

Development of Exergy Recuperative Reaction and Separation System

Atsushi Tsutsumi, Project Professor, Institute of Industrial Science, The University of Tokyo



Development of an innovative chemical process

- Based on our exergy recuperative heat utilization principle of energy use, we achieved one-fifth of the energy use in the conventional methodology by means of the innovative low energy chemical process through the cyclic use of low-level heat separated after the combustion

A New Research Project

Research Project

Ishiguro Symbiotic Human-Robot Interaction

Research Director

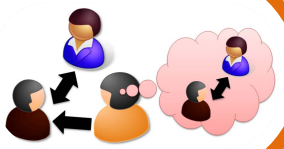
Hiroshi Ishiguro

Professor, Graduate School of Engineering Science, Osaka University / Director (visiting), Hiroshi Ishiguro Laboratories, Advanced Telecommunications Research Institute International (ATR)

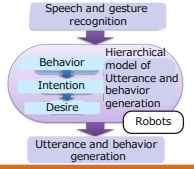
Invention of Interaction Technology involving various means of communication as human use them, and Development of Autonomous Robots capable of naturally interacting with humans ranging from children to elderly in social contexts

Safe Interaction Mechanism

Functions to Respond to Social Contexts and Use Various Means of Communication



Autonomous Context- and Purpose-Sensitive Communicative Functions



Autonomous Social Robot

- Elderly Care
- Communication Service in Public Facilities
- Communication Education and Learning Support

Society in which Humans and Robots Live Together via Enhanced Interaction

Publishing the 2nd Edition of Social Scenarios in which the Establishment of Low Carbon Societies is Realized

[The Center of Low Carbon Society Strategy (LCS)'s Social Scenario Development]

LCS makes a contribution to the establishment of an "affluent low carbon society," with a sustainable progress in Japan's economy and society and based on S&T. For this purpose, LCS envisions a desirable society in 2020-30 that will certainly lead to the society of 2030-50, promotes the creation of social scenarios that illustrate the process for establishing this society, and suggests social scenarios and strategies.

Specifically, by focusing on daily lives, quantifying current and future S&T, and analyzing economic efficiency assuming that the S&T has been introduced to society, LCS suggests options for visions of a low carbon society that can continue until 2050 and items to be realized.

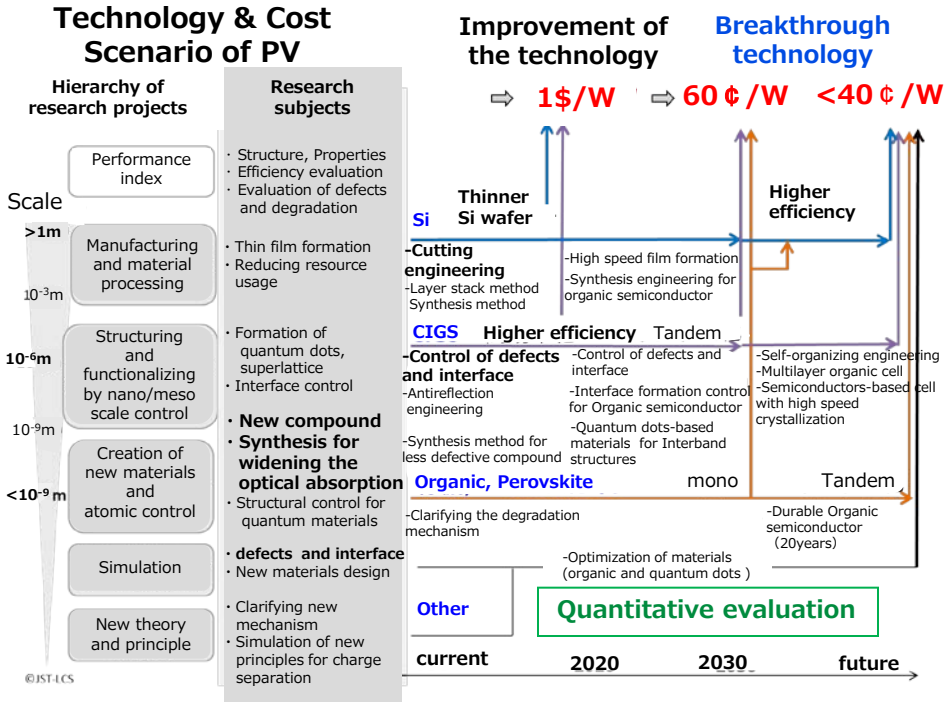


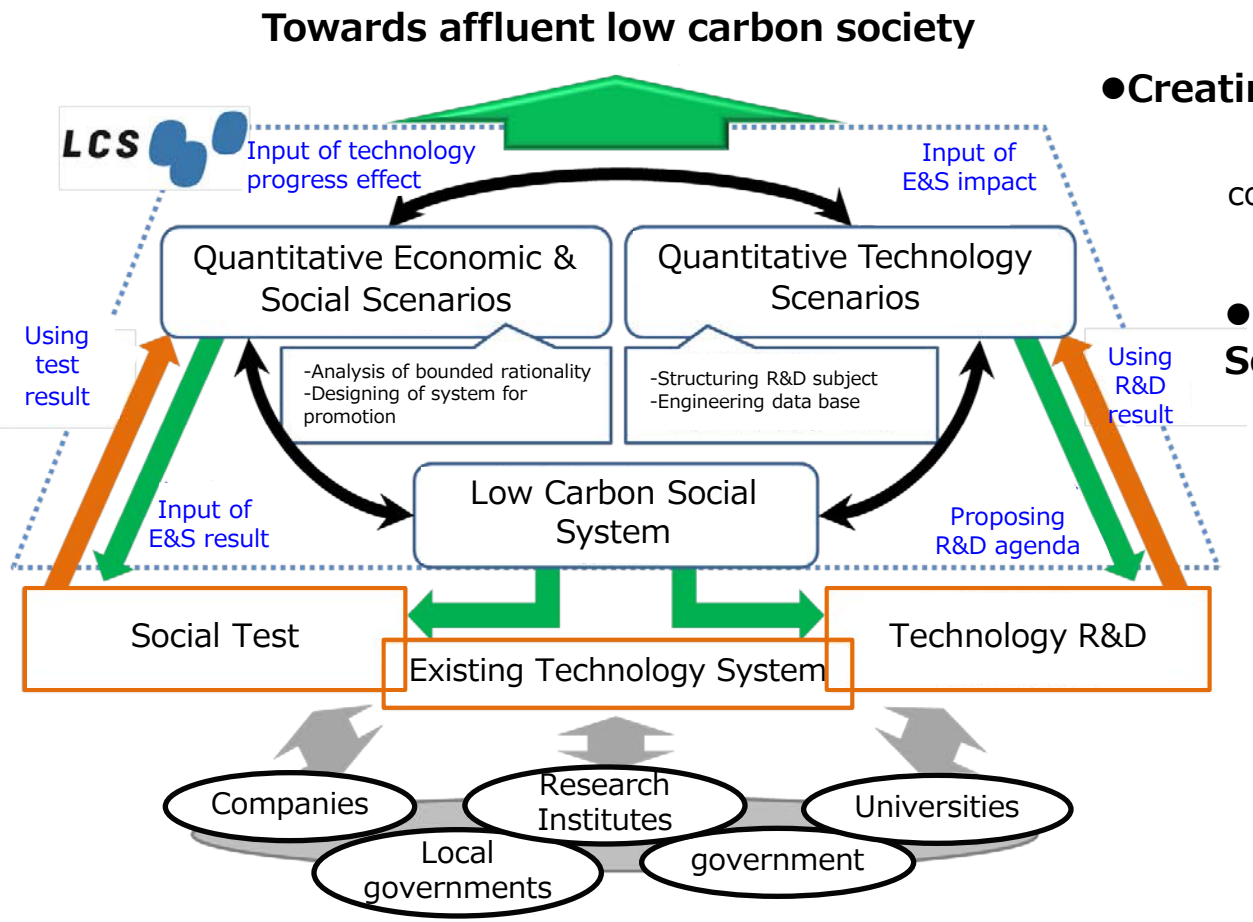
Diagram: An Example of the Quantitative Technology Scenarios (Road Map to S&T of PV)

[1st Edition of Social Scenario]
"Comprehensive Strategies and Scenarios for the Realization of a Low Carbon Society" (published on Jul. 2012)

[2nd Edition of Social Scenario]
"Summary Report 2014-Towards the Realization of 'Dynamic and Affluent Low Carbon Society'"
(published on Jun. 2014)
Reviewing the below proposal paper for policy-making of the1-9 and presenting a full picture of major challenges

Proposal Paper for Policy Making and Governmental Action toward Low Carbon Societies (Fiscal 2013)	
Strategy for Technology Develop-ment	1. PV Power Systems 2. Secondary Battery Systems 3. SOFC Systems 4. Methane Production from Biomass Wastes by Anaerobic Fermentation (First step) 5. Small/medium-scale Hydroelectric Generations 6. Platform of Low Carbon Technologies for Process Design and Evaluation of Manufacturing Cost and CO_2 Emissions
Strategy for Technology Dissemi-nation	7. Policy Designs for Bringing about Substantial Energy Savings in the Household Sector in Japan
Strategy for Internation-al affairs	8. Promoting Oversea Transfer of Technology for Climate Change Mitigation
Strategy for Social System	9. Policy Recommendation toward Low Carbon Society on Promotion of Energy Saving in Household Sector

Publishing the 2nd Edition of Social Scenarios in which the Establishment of Low Carbon Societies is Realized



●Creating Quantitative Technology Scenarios

Presenting objectives and agenda for conducting R&D of low carbon technologies

●Creating Quantitative Economic and Social Scenarios

Suggesting economic and social systems for promoting introduction and dissemination of low carbon technologies

●Proposing Social Systems

Publishing social scenarios where the creation of low carbon societies could be realized

Diagram: The process in which we create social scenarios in which the establishment of a low carbon society is realized

JST Research Institute of Science and Technology for Society (RISTEX)
A New Area of Research, "Designing a Sustainable Society through Intergenerational Co-creation"

◎ Research Institute of Science and Technology for Society (RISTEX)

Based on the idea "Science in Society and Science for Society," RISTEX makes every effort to create innovation that brings about the solution to various social issues, including an aging society, global warming, and safety and security risk management.

◎ The R&D Area "Designing a Sustainable Society through Intergenerational Co-creation"

Area Director: Kazuhiro Ueta
(Professor, Graduate School of Economics, Kyoto University)

[Outlines]

This R&D area aims to design a sustainable society by focusing on complex issues that a maturing society faces, such as declining a birthrate & aging population, fiscal contraction, and the effects of global climate change. Considering not only economic but also social and environmental values, it aims to achieve its objectives through interactions and collaboration between the stakeholders, namely people from various generations and diversity characteristics. The R&D area consists of transdisciplinary projects that involve the stakeholders as well as researchers and practitioners through solution finding activities.

[Objectives]

- Propose designs of sustainable cities and regions where people from different generations and diversity characteristics are socially involved, by utilizing practical and scientific knowledge, regional resources, and technologies.
- Establish a platform for intergenerational co-creation and knowledge sharing by incorporating scientific evidence.
- Standardize and integrate the results of the projects, and build a network of the stakeholders, in order to implement and promote the results.

[Period]

From FY2014 to FY2019 (scheduled)