Materials Innovation Strategy

by Establishing a "Knowledge Value Chain"

(Outline)

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Technology and Innovation Policy

Cabinet Office

Materials Innovation Strategy: Outline (2025.6 CSTI)

Establishing a "Knowledge value chain" -- a cycle of knowledge transfer continuously generating innovation that leverages Japan's diverse strength by clarifying the roles of key stakeholders. Japan seeks to maintain leadership in materials science, a core of its industrial base and a key enabler of innovation in areas like semiconductors and quantum technologies.

Area of Leadership

Accelerating R&D of focus area

Innovative industry and academic area, fostering talent

Short- to mid-term (focus area)

- High-performance and –valued materials on which Japan retains a technological advantage
- Key materials serving for resource security and supply chain resilience through realizing circular economy
- Materials for green energy toward realizing GX
- Key materials for economic security
- Next-generation manufacturing with sophisticated materials design and evaluation

Mid- to long-term (pioneering new frontiers)

- **Frontier of value**
  Challenge for new frontiers pinned down by backcast from social issues and forecast from new technologies
- **Frontier of science and technology**
  Challenge for the limit of performance and functionalities of current materials

Initiative for Leadership

Building a Knowledge value chain for converting excellent knowledge and technology to innovation by integrating Japan's technological strengths and diverse stakeholders. For this, recognition of value in "knowledge," i.e., value recognition of technological strength and "scientific excellence" triggering the value chain are important.

Actions we take

Accelerating R&D and social integration of "Innovative materials"

- Boosting R&D in priority areas
- Pioneering frontiers to create new value

etc

Driving "Innovation" forward

- Further advancing materials DX through Japan's strong data platform
- Foresting cross-sector collaboration

etc

Generating innovation "continuously"

- Fostering talent for research, R&D management, and engineering
- Creating scientific excellence
- Providing attractive research environment, enhancing global impact

etc

Materials Innovation Strategy: Actions We Take

Accelerating R&D and social integration of “innovative materials”

- **Boosting R&D in priority areas** *short-to mid-term*
  - Accelerating research and development (R&D) and social implementation, and providing assistance for the introduction of research equipment and facilities
  - Visualizing the value of GX and advanced technologies, and finding a market for it
  - Enhancing regulations, standards, and IP strategies for global markets, and advancing open-and-closed innovation strategies
- **Pioneering frontiers to create new value** such as innovative industry and research area *mid-to long-term*
  - Pushing value frontiers through maximizing performance or functionality with hybrid of known and new materials as well as innovative manufacturing ⇒ creating innovative industry
  - Pushing the limits of materials through scientific and technological frontiers
    ⇒ fostering promising seeds and talent, and creating innovative research area, which are important in time consuming material developments

Driving “innovation” forward

- **Further advancing materials DX through Japan’s strong data platform**
  - Enhancing usability and accelerating data sharing
  - AI integration and robotics fusion
  - Promoting data-driven R&D and outcomes
- **Foresting cross-sector collaboration**
  - building systems to clarify roles of and accelerate collaboration between industry and academia, or upstream and downstream
  - Maximizing the potential of diverse regional players such as regional universities, technical colleges, SMEs, and startups.
  - Sharing and matching seeds and needs
  - Advancing open-and closed strategies

Generating innovation “continuously”

- **Fostering talent for research, R&D management, and engineering**
  - Improving research environment and working conditions through industry-academia-government collaboration
  - Developing and securing talent for management and operations engineering of data/research infrastructures, and for cross-sector (e.g., industry-academia) management
- **Creating scientific excellence**
  - Sustained promotion of basic and fundamental research
- **Improving research environment, enhancing global impact**
  - Developing open, cutting-edge shared facilities including large-scale research infrastructure as a hub of talent and data creation
  - Promoting strategic research collaboration with global partners

etc