

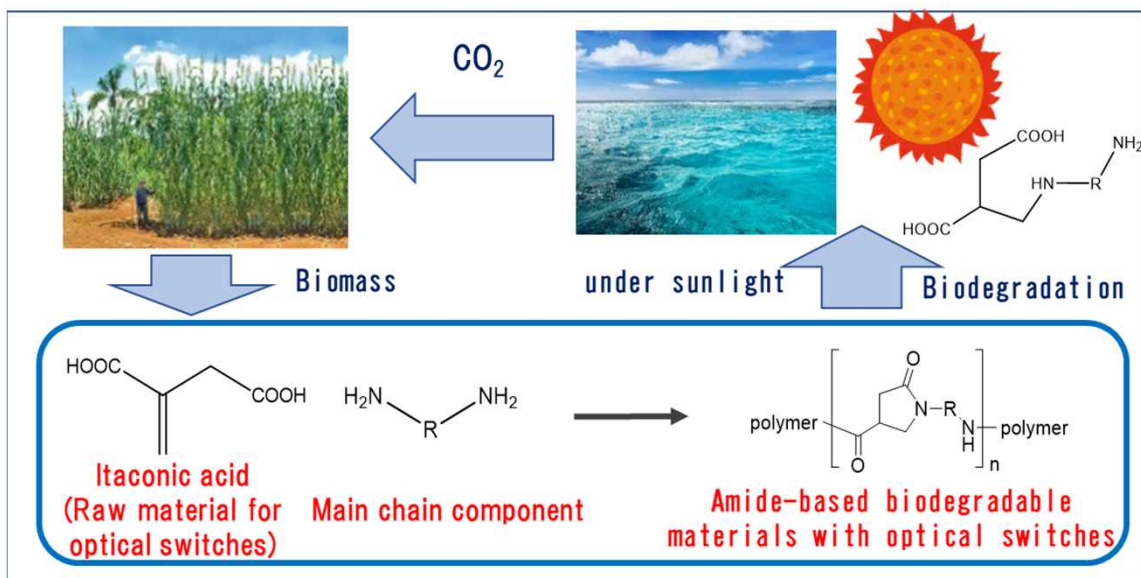


# Development of Photo-Switching Ocean-Degradable Plastics With Edibility

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## Summary

Biodegradable plastics are expected to be one of the solutions to the marine plastic problem, but they gradually deteriorate during use due to the action of microorganisms in the environment. The main chain of the plastic targeted in this project contains amide bonds, which, unlike conventional biodegradable polyesters, not only exhibits excellent physical and thermal properties, but also has a structure that is stable against biodegradation. When strongly exposed to moisture, the structure of the main chain changes, becoming hydrophilic and biodegradable. These are ideal biodegradable materials having an optical switch function, which do not deteriorate at the light intensity of the living environment, but biodegradation begins when left outdoors or floating in the sea and exposed to strong light. It is expected to be used in a wide range of fields such as daily necessities, packaging materials, and agricultural, forestry and fishery materials. In this project, we will study the improvement of the optical switching efficiency by compounding, and the control of physical properties and biodegradability by the molecular design of the main chain component, to promote the development of easy-to-use materials to expand the application to fibers, films, and injection molded products.



## KPI

### FY2023

Establishment of the basic principle of various optical switch biodegradability, establishment of evaluation methods for degradability and safety at the laboratory level, and optimization of the material system for efficient switch operation.

### FY2025

Development of plastics with photo-switching degradability using biomass-derived composition that guarantees degradability, safety, and business feasibility.

### FY2029

Development of prototypes and establishment of commercialization base for social implementation of biodegradable plastics with photo-switching degradability and safety on which the resource recycling system from biomass is established.

## Implementation

Japan Advanced Institute of Science and Technology, Kobe University, Nagoya University, Kagoshima University, Tokyo University of Science, Tokyo University of Agriculture and Technology, National Institute of Advanced Industrial Science and Technology, Osaka Research Institute of Industrial Science and Technology.