

Research and Development of Marine Biodegradable Plastics With Degradation Initiation Switch Function

Project Manager (PM) : Dr. KASUYA Ken-ichi, Gunma University
Contact : kkasuya@gunma-u.ac.jp
To send an email, please change * to @ in the above email address.

Summary

This research and development project aims to develop marine biodegradable plastics with a degradation initiation switch function to overcome the challenges of marine plastic waste and achieve Moonshot Goal 4, “Clean Earth”. This project consists of the following four development items. Item 1: Development of a new biodegradable base resin with various functions and characteristics, which can incorporate a “biodegradation initiation switch”, to apply the marine-biodegradable resin in various fields. Item 2: To perfectly control the time at which the biodegradable plastic begins to degrade, a “biodegradation initiation switch” will be developed, which triggers degradation of the material only after it is lost or spilled into the ocean. Item 3: Development of a biodegradation-rate control technology, which ensures the rapid and stable degradation in the marine environment after biodegradability is triggered. Item 4: Verification of biodegradability of the new biodegradable plastic to be developed, in the marine environment, and feedback of basic marine biodegradability data for material design to each item.

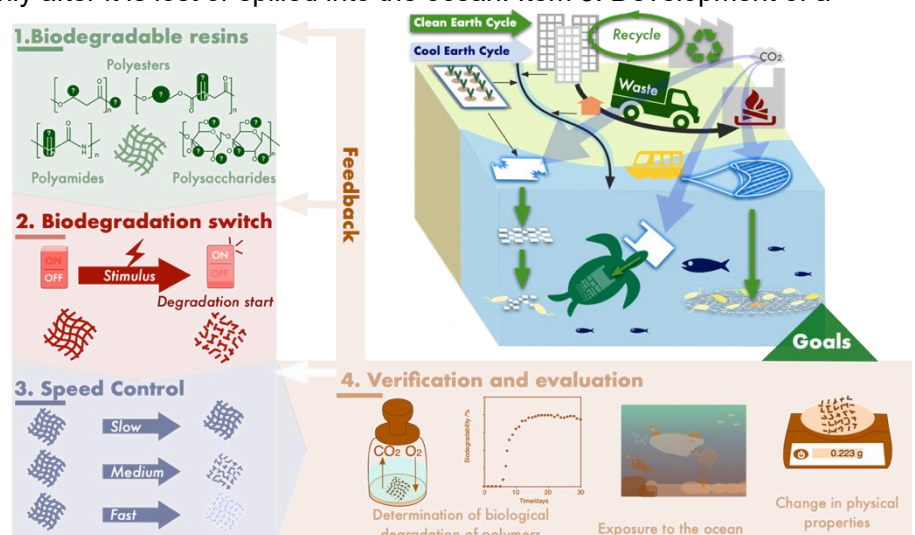


Figure. Outline of the research and development of this MS project and resource circulation to be realized through the project.

Targets by 2030

- FY2022: Demonstration of 5 or more types of switching functions; establishment of synthetic methods for bio-based biodegradable base resins that can incorporate 4 or more switching functions.
- FY2024: Developments of more than 5 types of switching functions and more than 3 types of marine biodegradable plastics incorporating these functions.
- FY2029: Materialization of 3 or more new bio-based marine biodegradable plastics that exhibit biodegradabilities of 90 % in 6 months in seawater at 30 °C after the switching function is expressed.

Implementation

Gunma University, The University of Tokyo, Tokyo Institute of Technology, Institute of Physical and Chemical Research (RIKEN), Japan Agency for Marine-Earth Science and Technology (JAMSTEC)