

Recycling and disposal systems in Japan and Eco-efficiency analysis of plastics waste

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Establishing a sustainable society is an essential objective of Japan and legislation about this objective enacted 11 years ago and government, municipalities, businesses and institutes have cooperated to make progress. In this movement, many type of plastic waste treatments have developed and have carried out.

In Japan, the amount of the discharge of plastics waste of containers and packaging (C&P) is the biggest, 47% of the total plastics waste discharge. The plastics waste of C&P consists of mixed plastics and is difficult to treat, and so, how to treat it is an important issue. Last year, the government began to reexamine the C&P law enacted in 1995, and then objective evaluation of the treatments of plastics waste of C&P by the Life Cycle Assessment (LCA) or so is required. We evaluated the environmental impacts (CO₂, NO_x, SO_x, resource consumption, energy consumption) brought by the mechanical recycling (MR), feedstock recycling (coke oven material, blast furnace material, gasification (FR3)), energy recovering (cement kiln material and fuel (ER2), incineration with electric power generation (ER1)), incineration without energy recovery and landfill (LF). We used the “basket analysis method” of LCA in this evaluation. And we normalized and integrated the environmental impacts. And also we evaluated the costs of the treatments of the plastics waste of C&P. The results and conclusions of this analysis are as follows. 1) ER1, ER2, FR3 are the most desirable techniques in terms of eco-efficiency (the balance between the environmental impact and the costs). 2) The eco-efficiency of MR is about the same as that of LF assuming that virgin resin alternative rate is 30%. 3) LF is the worst choice among all cases.