The Case Study of National-scale Material Flow Assessment－the Japan Experience

Kazuyo YOKOYAMA
Graduate School of Environmental Studies, Tohoku University, Sendai, JAPAN
E-mail: yokoyama@mail.kankyo.tohoku.ac.jp

Many industrial products with advanced functions are equipped with circuit boards, motors and wiring harnesses. These electric devices or equipments contain much kind of valuable materials, such as copper, lead, zinc, gold and so on. Establishment of an efficient and sound material cycle system should be promoted, to that end, the detail information about following questions will be needed.

Where and how much the valuable materials exist in our society?

When and how we can / should recover the materials from the durable commodities as secondary resources?

How we should manage valuable materials in our society?

The paper provides a brief overview of recent two projects which tackle such issues in Japan.

The former one is “Substance/material flows as sustainability indexes” which is funded by RISTEX-JST. MFA (Material Flow Analysis)/SFA (Substance Flow Analysis) Research Project is completed in Tohoku University, Nagoya University, Kobe Yamate University, Waseda University and the National Institute of Materials Science (NIMS) as a Contract Research Program “The Study on Sustainable Society” funded by RISTEX-JST (Research Institute of Science and Technology for Society - Japan Science and Technology Agency). The main objective of this research was quantitative investigation in terms of flows of base materials, such as iron and copper, and associated diffusible substances, such as rare metals and so-called tramp elements in steel, in eastern Asia using the methods of MFA, SFA, and waste input-output analysis (WIO). Our main outcomes were to quantitatively investigate flows of base materials, such as Fe, Al, Cu and associated substances, such as Mo, In, P by using the methods of material flow analysis (MFA), substance flow analysis (SFA), and waste input-output analysis, and to develop WIO-MFA model as a mathematical model that enables integrative assessment and analysis of these data from temporal and spatial axes.

The latter ongoing one is “Development of Material Stock Account Framework and Its Application: Strategies for Waste/Resource Management” which is funded by Ministry of Environment, 2006-2009. The objective of MSA (Material Stock Account) Project is development of MSA framework that is consistent with Economy-Wide MFA framework and applications of MSA about some specific materials. The significant amounts of minerals are accumulated as social stocks in our society, will generate as wastes and recover as secondary resources in future. For better understanding the metabolism of our economy, we focus on the stocked materials and estimate the amount of potential waste and secondary resources in our economy by the classification of the condition in material usage and attempt to avoid miscounting by identify the dissipation, unknown exports and so on.