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'Ecomaterials' in Japan through the Web-sites survey

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The research was made on how Ecomaterials are currently used in Japan. All the information was obtained from the Web-sites (including environmental reports) of the organizations concerned. In this paper, Ecomaterials on the market produced by approximately over two hundred and eighty listed companies in the stock market were researched and classified into the six categories. The attitude and activities on Ecomaterials differ widely among industrial groups and/or companies. Many research activities will be required in order to complete totally effective Ecomaterials whose environmental effect throughout the total life being fully evaluated. Many hazardous free Ecomaterials were already developed, but as is the case with Pb-free solders, many of them are still inadequate. More research activities aiming at the decrease of the amount of waste landfill will also be essential. Ecomaterials are still in the early stage of development in Japan and Japanese companies are only now realizing their importance. This study is intended to sort out and analyse current endeavours on the part of Japanese industries to develop and manufacture Ecomaterials best suited to "sustainable society".

Keywords : Japanese ecomaterials, classified ecomaterials, ecomaterials analysis in Japan

1. INTRODUCTION

Japanese companies listed in the stock market with more than 5000 employees were targeted and research was conducted on them through the Web-sites survey. We further selected the companies which issued their environmental reports openly in the web-sites for our research. In addition, several companies with less than 5000 employees which we regarded as important from the viewpoint of Ecomaterials were also researched. Environmentally conscious materials already on the market were chosen from the Web-sites homepages as well as from environmental reports of the companies and then were classified into the six categories propounded by Halada and Yamamoto (1) (2). In this paper, such Ecomaterials as were already on the market were counted, whereas 'these materials still on the R&D process and not yet on the market' were not. This time, the research was performed on 2001 year version. However, in case 2001 year version environmental report of a company was not prepared, we adopted the earliest version which appeared either in 2002 or 2003 for our research. As a result, 286 companies were chosen and categorized into sixteen industrial groups. In each industry, average number of Ecomaterials produced by a company was obtained by dividing total numbers of the Ecomaterials in all the categories by number of companies of an industry.

2. RESULT

The result was shown in Fig. 1. Raw materials are very important in the discussion of Ecomaterials. The characteristics of the Ecomaterials of a raw materials manufacturing company are determined by raw materials it produces. The characteristics are as follows.

2.1 Iron and Steel industry

Twelve hazardous free materials are produced by the six blast furnace steel companies in the industry, namely, Pb-free materials and Cromate free materials, whereas the three special steel manufacturers produce only two. Many higher material efficiency and Green environmental profile Ecomaterials are found as the result of effective R&D of many companies. As to recyclable type Ecomaterials, only one material of stainless made machine is found in one company among the nine companies reflecting the contention by Iron and Steel manufacturers that Steels are already recyclable Ecomaterials.

2.2 Non-ferrous metals industry

Three Ecomaterials of hazardous free types, are produced in this industry, namely non-halogen materials, Pb-free materials and chlorine-free plastics. Zn and Fe metal recycled from electric furnace flue gas, non-ferrous metals from plating industry sludge and scrap metal, and noble metals from semiconductor scrap and many other scraps, are important recycled metals in this field.

2.3 Chemical industry

Many functional materials for environmental protection are on the market by this industry and contribute to the direct protection of environment. As the typical items of this type, 'filter materials and catalysts for cleaning up air and water, 'active carbon for

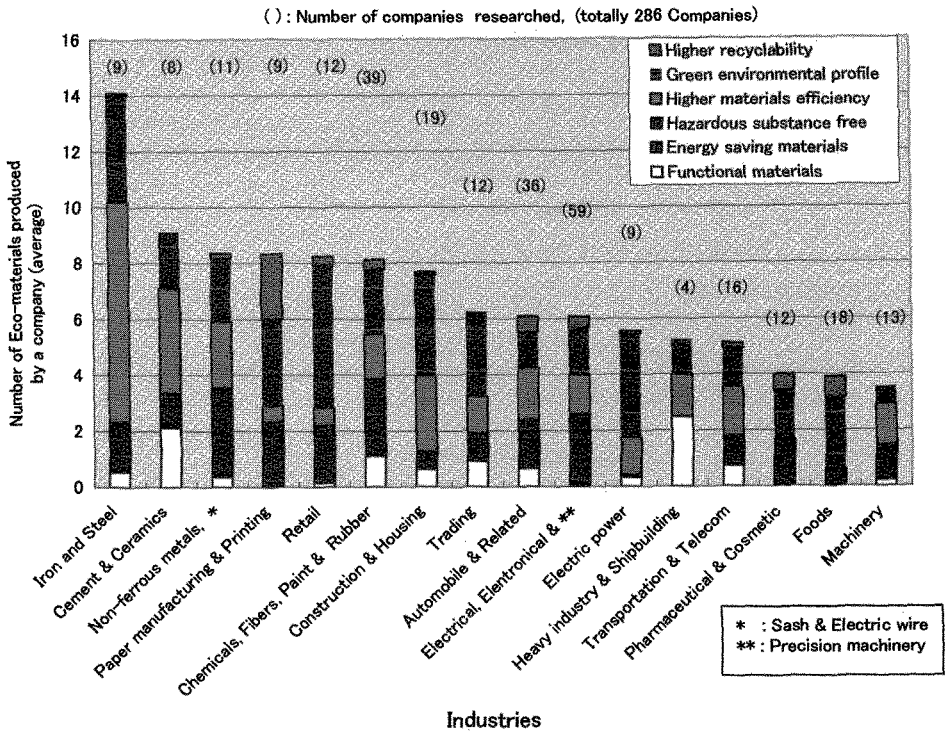

Fig.1 Japanese Ecomaterials on the market (shown in web-sites of 286 companies)

absorbing system' and 'hollow filter materials and catalysts for cleaning up air and water', 'active carbon for absorbing system' and 'hollow fiber membrane for cleaning up water' are to be mentioned. The same can be said about energy-saving materials. Hazardous substance free type Ecomaterials are very important constituent in this field.

2.4 Cement industry

Many kinds of higher materials efficiency type cement of good quality and long life were developed. Several materials manufactured from waste such as blast furnace cement are on the sale. Coating materials on Cement surface of photocatalyst for air cleanup were developed. However no Ecomaterials of another categories could be found.

2.5 Electrical appliances, Electrical machinery and Precision machinery industries

As seen in the case of personal computers and printers, the marketing of hazardous free products is given a very high priority. Many higher 'materials efficiency types' are being developed with the aim of advancing products quality. Due to the enactment of the law promoting the recycling electrical appliances in Japan, efforts are presumably focused mainly on the change of design of the combinations and connecting methods. Consequently, Recyclable Ecomaterials are rather scarce.

2.6 Construction industry

Many higher materials efficiency (higher 'services of various types' / 'input material') type Ecomaterials can be seen in order to ensure the longevity of construction and structure. Green environmental profile type Ecomaterials are often used to facilitate the reuse of crashed construction waste after the destruction of old and 'out of the use' construction. However, the result in this area is still inadequate and more research activities will be urgently needed for the solution of this very important problem.

2.7 Automobile and related industry

Many hazardous substance free type Ecomaterials were developed for avoiding trouble at the car recycle. Many efforts are directed for making light weight and energy-efficient cars in the Ecomaterials field. Catalystic materials for exhaust gas purification were developed, but further research is still needed and continued.

2.8 Others

To comply with the Japanese law and regulation about container and package, hazardous substance free type plastics of film and related packaging materials are adopted widely in many industries. It shows the effectiveness and importance of laws and regulations. Housing industry puts forth considerable efforts to avoid 'sick house syndrom', one of the most urgent subjects widely reported in TV news. Considering the large influence on the earth environment of Ecomaterials, many big research will be required in these fields.

3. SUMMARY

By classifying Japanese Ecomaterial on the market into the six categories and observing the way Ecomaterials are used, the activities currently developed for sustainable society and the sort of activities to be required in the near future in Japan have become all clear. Japanese Ecomaterials currently on the market are not yet in good balances. To ensure that the research activities be in better balances, setting out the guideline of Ecomaterial will be earnestly required at the first opportunity.

References

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