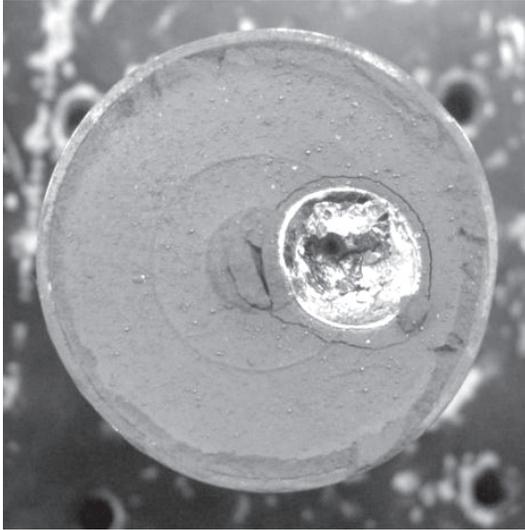


**THE MAGNESIUM
CIVILIZATION**

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THE MAGNESIUM CIVILIZATION

AN ALTERNATIVE
NEW SOURCE OF ENERGY TO OIL



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Preface

“This is it.”

It was a short stick made of a beautiful green-colored material like jade that the professor placed on the table. And a plastic bag filled with small metal flakes in silver-white color was placed next to it.

This green stick and the silver-white metal will change the world.

If someone told you that, what would you think?

The green stick was a chromium co-doped neodymium yttrium aluminum garnet (YAG) laser medium. It is a magic stone that converts sunlight into a direct laser beam. The silver-white metal is not such a rare thing. It is magnesium, a lightweight and durable metal.

About a few years ago I (Yamaji) heard for the first time about the research of Professor Takashi Yabe at Tokyo Institute of Technology. The professor said that he could smelt metal magnesium with laser generated by sunlight. It is magnificent research, but how on earth can such research be realized? I clearly remember that that was what I thought.

Was the research really advancing? I visited Professor Yabe's laboratory by coincidence and found out that in fact they were steadily getting results from their research there.

Even with the bad weather conditions in Tokyo, the chromium co-doped neodymium YAG laser medium oscillates laser from sunlight. And a powerful laser smelts the magnesium. Metal magnesium can be smelted from a compound instantly by irradiating laser. Professor Yabe says that we can drive a car and operate a power station by using as fuel magnesium produced in this way.

What will supply the enormous amount of magnesium is the sea—extracting magnesium from seawater, smelting it at low cost, and returning the wasted fuel into metal magnesium with laser again.

In this cycle greenhouse gases, such as carbon dioxide, are not emitted. This is the vision for the recycling society using magnesium in place of oil and coal.

Hearing just this part of the research, many would think of it as science fiction. Actually the practical use of some part of the research has already started.

Recently natural energy is attracting much attention because of the uneasiness with the supply of fossil fuels and the sense of the global-warming crisis. The usage of solar power generation with the solar battery panel, wind power generation, and biomass is advancing slowly. The hybrid car, which combines a gasoline engine with a charged battery, is now popular, and it is said that a car running only by electricity will soon be on the market.

Then, would solar power generation and the electric car become the radical solution to the energy and environmental problems?

To tell the truth, solar power generation cannot meet our current energy demand. The electric car has problems with the resources that it needs and the mileage it can give.

Japanese Prime Minister Yukio Hatoyama announced, as an ambitious target, that Japan would “reduce the greenhouse gases 25% compared to 1990,” but the response from the business world has not been welcoming: “It is impossible to realize that, anyway.”

However, I think a big opportunity is waiting for us. An idea that is beyond the conventional framework produces new technologies and even changes the social structure. We are at an industrial turning point, the end of the fossil fuel era, which lasted for almost 200 years.

The vision of the “magnesium-recycling society” offers us a suggestion about the society we should aim for.

For this book, Yamaji gathered research material from Professor Yabe (“I” in the text means Professor Yabe). I tried to, as much as I could, explain a complicated research in plain words so that a person who is not an expert can easily understand it.

What kind of world does advanced technology lead us to? I very much want you to feel the excitement with this book.

Tatsuya Yamaji

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