

Special Contribution: The Missions of Science and Technology

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Today, science and technology have two important missions. One is to address global environmental issues, and the other is the Fourth Industrial Revolution. What can science and technology do in order to fulfill these two missions? Are these two missions completely separate? Or, are they linked in some way? I think they are linked to each other.

First, let's take a look at the history of the industrial revolutions that humanity has gone through so far.

The First Industrial Revolution began with James Watt's invention of the steam engine in the 19th century. This was followed by the Second Industrial Revolution in the 20th century, which gave rise to a society of mass production and mass consumption. Through these two industrial revolutions, humanity created a society with high levels of affluence and convenience, but at the same time, they also gave birth to a huge negative legacy of environmental problems. After that, humanity headed for the next industrial revolution. The Third Industrial Revolution, also known as the Information Technology (IT) Revolution or the Information and Communications Technology (ICT) Revolution, started in 1995. This gave rise to the present mobile-IT society.¹ The lithium-ion battery, which has been my field of study, was born and grew with the third industrial revolution. While the First and Second Industrial Revolutions were focused on goods, the Third Industrial Revolution was focused on information. The Fourth Industrial Revolution is about creating a new society by integrating these goods and information technologies. New technologies and concepts such as artificial intelligence (AI), IoT, sharing, and the 5th generation mobile communication system (5G) will be the means to realize this. This is where environmental issues and the industrial revolution meet. In other words, I believe that the Fourth Industrial Revolution is about resolving the negative environmental problems created by the past industrial revolutions and realizing a sustainable society. We are already beginning to see a part of it. Recently, the buzzwords "CASE"² and "MaaS"³ have been heard in the automotive industry. This is a true precursor to the sustainable society created by the Fourth Industrial Revolution.

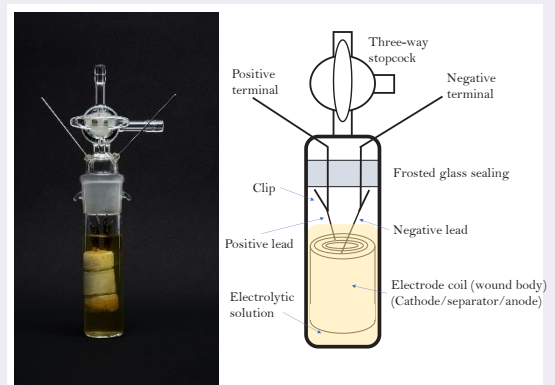
When will the world begin to move towards it? I believe that this will start around 2025, and a truly sustainable society will be realized by around 2035. This is how the world is going to change considerably in the coming years. I hope that Japan's science and technology will make a major contribution to this transformation.

Last but not least, as my message to children and young researchers of today, I would like to say that this time of great change is a golden opportunity for you. I can assure you that there will be a place for you to shine.

<Reference URL> A Message from Akira Yoshino in the Time of Coronavirus
https://www.mext.go.jp/a_menu/coronavirus/mext_00030.html



YOSHINO Akira
 Source: Asahi Kasei Corporation



Replica and schematic drawing of the first prototype lithium-ion battery developed in 1983

Source: Asahi Kasei Corporation

¹ Society where mobile phones, smartphones and other portable information and communication devices are widespread.
² Connected, Autonomous/Automated, Shared, and Electric.
³ Mobility as a Service