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Ryoji Noyori

野依良治

■Purpose of Exhibition

In 2001, Ryoji Noyori and William Knowles were awarded the Nobel Prize in Chemistry for their work on chirally catalyzed hydrogenation reactions; they shared the Prize with Barry Sharpless, who was recognized for his work on chirally catalyzed oxidation reactions.
Many things around us exist in a “mirror image” relationship, such as our left and right hands. The same applies to the molecular world, with some substances exhibiting varying properties in their left- and right-handed versions, even though they have the same atomic composition and permutations of bond.
The reaction that can produce either a left-handed or right-handed molecule as desired is called an “asymmetric synthesis reaction.” Ryoji Noyori discovered this by using a chiral catalyst, which employs a metal catalyst to facilitate the reaction as well as a template molecule that results in either left-hand or right-hand molecules.
Today, a variety of different industries, such as the pharmaceutical and fragrance industries, use chiral catalysts for chemical synthesis.

■Additional Knowledge

High Unit
The High Unit exhibit introduces Ryoji Noyori and presents the details of how he earned his Nobel Prize. It covers Noyori’s background, events that took place during his student years, and his life as a researcher. Revealed at the counter are three specific episodes that had a significant impact on Noyori’s life. This exhibit also presents various other episodes in his life and introduces his thoughts on a number of diverse subjects. While preparing this exhibit, we conducted several interviews with Noyori. We noticed that, no matter what he was discussing, he demonstrated great passion for the topic. We very much hope that, through these exhibits, we have been able to portray Noyori’s spirit as a passionate researcher.

The World of the Left and Right
The starting point for Ryoji Noyori’s award-winning research was the distinction between left and right. Therefore, here at the museum, we focused on things in the world that exist in a mirror-image relationship. We also collected various examples of such left and right-handedness. Why not look for products, creatures, and even molecules around you that exist in mirror-image left- and right-handed forms? You can then consider why these left/right forms exist. You might want to keep an eye out for various other things that exist in mirror-image left- and right-handed forms and ponder why such differences exist.

The Chemical Synthesis Game
The discovery of chemical is one of the most important events in the field of chemistry. Several Nobel Prizes in Chemistry have been awarded for various chemical syntheses in addition to asymmetric synthesis reactions. Actual chemical synthesis involves many varied elements, but in this exhibit you can learn about this subject without having to ponder the intricacies of chemistry simply by playing with balls that resemble atoms and molecules. In addition, catalytic reactions appear as you

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move up the levels of the game. A catalyst is a substance that itself does not itself undergo any change in a chemical reaction but serves to enable or promote the desired reaction. We invite you to have fun with this exhibit as you experience the world of chemical synthesis.

Live as an Individual — Professor Ryoji Noyori, The Road to the Nobel Prize (2002), Yomiuri Shimbun Chubu, local news edition (Chuokoron-Shinsha)
Research is Fresh (2002), Ryoji Noyori, University of Nagoya Press
Facts Are The Enemy Of The Truth (2011), Ryoji Noyori, Nikkei Publishing
The New Ambidextrous Universe, New Edition (1992), Martin Gardner, Kinokuniya Bookstore
Catalytic Chemistry, 2nd Edition (2009), Makoto Misono, Yasukazu Saito, Maruzen Publishing

Note: Titles of books and articles above published only in the Japanese language are translated for convenience.