

# Nobel Prize in Chemistry 1981

Nobel Foundation



Chemistry

## Awarded for

his work concerning the course of chemical reactions

## Kenichi Fukui [ 1918 - 1998 ]

Doctor of Engineering  
Professor Emeritus, Kyoto University

### Achievements

Professor Fukui strived to theoretically elucidate chemical reactions using quantum mechanics. Classical theory of chemical reactions based on electrical attraction between a positively charged atom and a negatively charged atom cannot explain all chemical reactions. Quantum mechanics dictates the existence of orbitals, which represent the energy and distribution of electrons in a molecule. Fukui discovered that some of these orbitals play critical roles in chemical reactions, and then provided a perfect description of the essence of chemical reactions. In 1952, he published this description, which he called the frontier electron theory (later renamed the frontier orbital theory). The frontier orbital theory is useful in understanding and predicting numerous chemical reactions, and remains essential in today's chemistry. In 1981, Fukui was awarded the Nobel Prize in Chemistry for his achievement.

### Profile

Kenichi Fukui was one of the most distinguished chemists in Japan and was a professor at Kyoto University from 1951 to 1982. He believed that the basic science research is very important, that research experience requires originality, and that people should foster a peaceful relationship between science and society. A number of his students have also contributed to the field of chemistry being inspired by his teachings. He always liked jotting down his research ideas.

#### Timeline

1941	Graduated from Kyoto Imperial University Faculty of Engineering
1945	Associate Professor, Kyoto Imperial University
1948	Received Doctor of Engineering from Kyoto University
1951	Professor, Kyoto University
1971	Dean, Faculty of Engineering, Kyoto University
1982	Retired from Kyoto University and entitled Professor Emeritus
1982	President, Kyoto Institute of Technology
1988	Professor Emeritus, Kyoto Institute of Technology
1995	President, Japan Society for the Promotion of Science

#### Other Awards and Prizes (selected)

1962	The Japan Academy Medal, Japan
1981	Order of Culture, Japan
1988	Grand Cordon of the Order of the Rising Sun, Japan
1989	Foreign Member, the Royal Society, UK