J. Georg Bednorz Biography

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Biography

In 1911, the Dutch physicist Heike Kamerlingh-Onnes discovered the phenomenon of superconductivity, the total loss of electrical resistance by a material. Potentially, the discovery had enormous practical significance. All electrical devices operate very inefficiently because so much energy is lost in overcoming electrical resistance. A device with zero electrical resistance could operate very efficiently and would be an economic bonanza.

The problem with Kamerlingh-Onnes discovery was that his materials became superconductive only at very low temperatures, close to absolute zero (0° K;-273°C). Such conditions made it impractical to design and build commercial devices with superconducting materials.

Over the next 75 years, researchers were largely unsuccessful in improving this situation. The idea of a *practical* superconducting electrical system remained elusive. then, in 1986, K. Alex Müller and his student, J. Georg Bednorz, discovered a ceramic oxide substance that becomes superconductive at 35° K (-238 °C). Although that temperature is still very cold, it is much higher than anything that had been found up to that time. More important, the discovery set off a flurry of research aimed at increasing this temperature even more. Within a matter of months, materials were found that become superconductive at temperatures of 98 ° K (-175°C) and even higher.

Bednorz was born in Germany on May 16, 1950. He earned his bachelor 's degree at the University of Münster in 1976 and his doctorate at the Swiss Federal Institute of Technology in 1982. He joined IBM Research in Zurich in January 1982. Bednorz shared the Nobel Prize for physics in 1987 with his advisor, Professor Müller, for his work on superconductivity.

Bednorz is now an IBM Fellow. He is currently studying the development of complex oxide compounds with novel crystal structures and methods of changing them for use in microelectronics.