Carl Bosch Biography

Carl Bosch

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Biography

As a chemist working for a large German company, Carl Bosch became responsible for transforming a laboratory demonstration project into a practical, large-scale operation. Through Bosch's efforts, Fritz Haber's method of ammonia synthesis became one of the twentieth century's most important industrial processes.

The son of an engineer, Bosch worked as an apprentice metalworker in a machine shop after graduating from high school. He later attended college and earned a doctorate in 1898 from the University of Leipzig. The following year, Bosch was hired by Badische Anilin und Sodafabrik (BASF). When Fritz Haber approached BASF with his proposal for commercial production of ammonia in 1908, Bosch was assigned to solve the task of bringing Haber's process up to industrial scale. Bosch solved two of these problems: the supply of raw materials and the provision of suitable catalysts fairly easily. His most difficult challenge lay in the design of equipment that could withstand the extremely high pressures required for ammonia synthesis and survive the corrosive effects of hydrogen gas.

During several years of round-the-clock operation, Bosch conducted more than 20,000 separate tests in some two dozen experimental reactors. He substituted alloyed steel in place of Haber's carbon steel reactor, and he invented an ingenious method of shielding the inside of the reactor with a thin, perforated iron liner. Bosch also developed instruments to control and monitor gas purity, temperature, and heat flow within the reactors. In 1913, a huge ammonia synthesis plant in Oppau was opened for production.

During World War I, Bosch arranged with Haber to begin producing nitric acid from ammonia via the Ostwald-Bauer process. Nitric acid was needed for Germany to continue manufacturing ammunition after its supply of raw material for explosives had been cut off by Allied ships. In 1931, Bosch shared the Nobel Prize in chemistry with Friedrich Bergius (1884-1949) for developing the high-pressure reactor technology needed for ammonia synthesis. Bosch had also been involved in research on manufacturing synthetic fuels such as methanol and gasoline from coal and oil. In 1935, Bosch reached the highest position in executive management in German industry when he succeeded Max Planck (1858-1947) as head of the Kaiser Wilhelm Society. Bosch continued to work in Germany until his death in 1940, but managed to avoid working for the Nazi regime.