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# Chemistry at EAWAG

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## A Key Player in Environmental Research

### EDITORIAL

The Swiss Federal Institute for Environmental Science and Technology, formerly Swiss Federal Institute for Water Resources and Water Pollution Control (EAWAG), was founded in 1936. Since then environmental problems challenging our society in general and environmental chemists in particular have become increasingly complex. At first, EAWAG was, according to its original name, an institute for water resources and water pollution control. Water pollution has evolved from mainly local contaminations by household and industrial wastes to increasing pollution by synthetic organic chemicals and by heavy metals with regional impact. Eventually, human activities began to interfere with hydro-biogeochemical cycles on a global scale. Environmental chemistry has evolved in response to these changing environmental problems *i)* by the application of inorganic and organic chemical principles to aquatic systems, *ii)* by applying analytical chemistry to environmental systems, *iii)* by combining chemical expertise with knowledge of environmental and engineering systems, and *iv)* by studying the interactions between various environmental compartments (water, soil, biota, and air). These developments in environmental chemistry started under the directorship of Prof. *Werner Stumm* (1970–1992), during which EAWAG was transformed into an institute for environmental science and technology.

In the early 1970s, environmental chemistry was thought of as mainly analytical chemistry. At that time, a very prominent ETH professor for analytical chemistry made the critical comment that environmental chemists were rather ‘flower picking’ than doing real science. Later, he was, however, strongly impressed by the results of analytical environmental chemists who succeeded in determining trace pollutants in many parts of the environment. Since then a large group of EAWAG researchers and graduate students has set out to contribute to broadening the scope of environmental chemistry. Today, environmental chemistry is a well-established and recognized discipline. In 1995, the *Nobel* prize for chemistry was awarded to environmental chemists (*Crutzen, Molina, and Rowland*).

Since the Rio summit and since the beginning of Prof. *Alexander Zehnder*’s EAWAG directorship in 1992, the general public, politicians, and scientists have recognized that the development of the present human civilization must not take place at the expense of future generations. This means above all a sustainable use of our resources, in particular of water, since water will be one of the limiting factors for nourishing of the world’s growing population. Environmental chemistry including chemical ecotoxicology will also play a key role in this new type of sustainability research,

which by its nature must be transdisciplinary. We strongly believe that this research has to be based on sound basic science integrating state-of-the-art theories and methods of each of the participating disciplines. This represents a continuing challenge also for the researchers at EAWAG.

This special CHIMIA issue 'Chemistry at EAWAG' wants to document both the broad scope as well as the scientific depth of environmental chemical research and development using examples taken from projects undertaken at EAWAG. The first chapter puts environmental chemistry into a larger perspective and explains major objectives and concepts. The following articles present scientific approaches and case studies, including investigations in the laboratory with well-defined systems, field studies, and the connections between these approaches by means of mathematic modeling.

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