

Preface

Water availability is a key problem not only from the environmental point of view, but also from the industrial one, taking into account the fact that available water resources represent less than 1% of the total amount of water on the earth's surface. Furthermore, in European and North American countries, domestic and industrial uses represent 50–60% of the total water consumption, in comparison to a percentage of ca. 30% on world-wide basis. It is thus evident that water has to be considered a valuable commodity, that it currently plays a key role in relation to compatible industrial development and that this role will be even greater in the near future; attention will be increasingly focused not merely on production costs and pollutant control, but also more and more on the use of chemistry for pollution prevention. Catalytic processes offer useful contributions in the development of more environmentally friendly processes as well as in technologies for the purification and recycling of industrial waste waters. However, owing to: (i) the complexity of the problems addressed, (ii) the necessity of an almost complete conversion of harmful products to non-toxic chemicals, and (iii) the necessity to operate within severe constraints caused by up-stream processes, it is evident that only integrated and multidisciplinary approaches can give rise to significant improvements in the current state-of-the-art.

This special issue of *Catalysis Today* collects most (but unfortunately not all) of the contributions presented at the European Research Conference on “Natural Waters and Water Technology: Catalytic Science and Technology for Water”, organised in Acquafredda di Maratea (Potenza, Italy) from 3rd to 8th October 1998. The aim of this event was to offer an integrated approach to the technologies for the reduction of water consumption or pollution as well as the purification or recycling of waste waters. The meeting

covered both fundamental and applied topics with the aim of giving effective and rapid development in the competitive market for catalysts for environmental protection. Together with academic researchers of various disciplines, a significant presence of speakers coming from industries or technological institutions had been organised with the aim of developing a background of fundamental knowledge on the topic of water purification/recycling, of defining the industrial objectives and of stimulating an integration between academic and industrial research.

The main topics treated were: (i) reduction of water consumption or pollution and possibilities for water recycling; (ii) catalytic treatments for drinking waters; (iii) catalytic wet oxidation and ozonization processes; and (iv) new processes for the treatment of very diluted pollutants in waste waters. For the first topic, reviews of updated approaches in the chemical industry such as integrated environmental protection and/or strategies and opportunities for recycling leading to significant reductions in water consumption or pollution gave a basic introduction to the sessions focused on specific industrial constraints or technologies. A specific session was devoted to the production of drinking water, a current key problem from both a quantitative and a qualitative point of view; the different technologies currently used, as well as more specific aspects such as nitrite/nitrate removal by hydrogenation, were discussed in this session.

In the field of wastewater treatment, well established technologies can also lead to interesting improvements or new applications. Typical examples are catalytic oxidation, wet oxidation and ozonization processes, for which a significant number of papers was scheduled, these including introductory contributions focused on the ‘past, present and future’ of the different processes and the strategies applicable.

Furthermore, it was clear that new technologies or applications may also be possible in these fields, for example advanced oxidation technologies (ATOS) with ozone or the application of wet air oxidation as a preliminary step to the biological treatment in an integrated process. Also presented were the state of the art and the perspectives for solid-catalyzed oxidation and reduction processes for the treatment of small amounts of toxic compounds in waste waters, with information on novel processes that combine separation steps and reactions at high temperature.

Finally, while stressing the new applications, conditions or opportunities for current technologies/processes, new emerging technologies such as for example photo-degradation were presented, the focus being on their specific features, particularly their advantages and/or limits in industrial applications. Significant examples were presented of these technologies for the removal of diluted pollutants for which the classical methods are not economical, even though these are applied nowadays only on a laboratory or pilot-plant scale.

In conclusion, notwithstanding the difficulties met during the preparation of this special issue (chemists are highly entropic systems!), the quality of the papers submitted scientifically justified our work as Guest Editors. We are, therefore, very satisfied with the results achieved: the appreciation of the readers will be the best reward for our efforts.

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