



Preface

Although there are no universally accepted definitions of fine or speciality chemicals and these terms are not based on any intrinsic properties, it may be useful to define them as compounds which have a price of more than 8–10 €/kg and have a worldly yearly production of less than about 10,000 tons, without any significant differentiation between small volume intermediates and final products (pharmaceuticals, pesticides, flavours and fragrances) [1]. From a chemical point of view, fine chemicals may be considered to be complex and multifunctional molecules, requiring multi-step syntheses, these generally performed in multi-purpose equipment. The above considerations introduce significant differences between organic and fine chemical synthesis; in the second case, both economic and environmental factors have to be considered, since the chemical industry is currently under increased pressure to develop more environmentally acceptable production processes, trying to prevent waste formation at the source [2].

From this point of view, fine chemical production has to be considered as highly polluting, taking into account the huge amounts of waste produced per kg of product, the so-called “E factor” [3–5]; this is partly because it involves multi-step syntheses and partly because it requires the use of stoichiometric reagents. The simplest and most accessible solution to the waste problem in fine chemical production would be the widespread substitution on an industrial scale of the old and polluting stoichiometric technologies by new cleaner catalytic alternatives. However, a number of different factors (small production amounts, short product lifecycles and times to market and, last but not least, the almost parallel evolution of organic chemistry and catalysis) have opposed the wide application of such an obvious solution—although it must be noted that the relevance of these factors is continuously decreasing. In fact, under the mounting pressure of environmental legislation, the fine chemical industry is being forced to move towards waste minimization and elimination of hazardous or toxic reagents.

The “Catalysis Applied to Fine Chemistry” Symposia probably represent the most important and focused European answer to this demand for more and more widespread application of catalytic methodologies, having a direct connection with the similar series of events in the USA, the ORCS Conferences. The eighth event of this series (CAFC-8) took place in Pallanza VB (Italy) from 16th to 20th September 2007, a wonderful small town located on the shore of the Lago Maggiore in the Italian Alps. The main objective of the meeting was the integration of heterogeneous, homogeneous and biocatalytic approaches, stimulating interactions between academia and industry to contribute to the promotion of new concepts for the development of highly efficient catalytic methodologies for fine chemical synthesis, reflecting also green chemical aspects [6,7].

The Symposium had a large and qualified participation of both industrial and academic researchers (more than 200 participants) who took advantage of the wonderful and peaceful location not only to follow the lectures but to exchange experiences and develop further collaborations. The Symposium scheduled different topics (enzymatic and chemo-enzymatic processes, benign oxidations, catalysis for C–C bond formation, enantioselective catalysis, innovative catalytic procedures/media, and organocatalysis), reflecting the above general considerations, but also placing emphasis on aspects common to all areas of catalysis. The Symposium included seven plenary or keynote lectures, given by international industrial and academic speakers, and also included 34 oral and 66 poster presentations.

This special issue of *Catalysis Today*, which collects in one volume the main contributions to the CAFC-8 Symposium, has been produced to avoid the possible waste of this important contribution to the upgrading of the catalytic technologies in fine chemical production. The papers have been subjected to a careful refereeing procedure, and we are most grateful to many national and international colleagues for spending time and energy in the refereeing of the manuscripts submitted to achieve the high scientific level of the issue. We hope that readers may enjoy this issue and gain advantage from it: reader satisfaction will be the best counterbalance to the time and energy spent in assembling the issue.

References

- [1] R.A. Sheldon, H. van Bekkum (Eds.), *Fine Chemicals Through Heterogeneous Catalysis*, Wiley-VCH, Weinheim, 2000, p. 1.
- [2] C. Christ (Ed.), *Production-Integrated Environmental Production and Waste Management in the Chemical Industry*, Wiley-VCH, Weinheim, 1999.
- [3] R.A. Sheldon, *Chem. Ind. (London)* (1992) 903.
- [4] R.A. Sheldon, *Chemtech* (March) (1994) 38.
- [5] R.A. Sheldon, *J. Chem. Tech. Biotechnol.* 68 (1997) 381.
- [6] P.T. Anastas, J.C. Warner (Eds.), *Green Chemistry: Theory and Practice*, Oxford University Press, Oxford, 1998.
- [7] P.T. Anastas, T.C. Williamson (Eds.), *Green Chemistry: Frontiers in Chemical Synthesis and Processes*, Oxford University Press, Oxford, 1998.

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