



## Preface

After EuroCombiCat 2002, held in Ischia, Italy, and EuroCombiCat 2007 in Bari, Italy, DECHEMA (Germany), within the framework of the TOPCOMBI consortium (FP7), organised the latest conference in the series. EuroCombiCat 2009 took place from March 26 to 29 of that year in Gandía, Spain, and was hosted by Instituto de Tecnología Química (ITQ). The scientific programme was organised around six main topics: Hardware and methodology development, Polymerisation catalysis, Industrial case studies, Heterogeneous catalysis, Homogeneous catalysis and Data management and Information technologies. In total, five plenary lecturers gave an overview of their respective fields, fourteen keynote lecturers presented in-depth research results, and fourteen hot-slot presentations focused on current developments of special interest for the community. Furthermore, thirty posters contributed to the scientific programme. The conference attracted eighty-three participants from sixteen countries as well as six exhibitors who presented their products and developments to the participants. The friendly atmosphere and open discussions were strongly appreciated by all.

As in 2007, the organisers have decided to publish the most outstanding contributions, after peer review, in this special issue of Catalysis Today.

Combinatorial and high-throughput (HT) for Materials Science has grown very rapidly, developing into a stable and mature domain of research. A settled community is now established, fifteen years after the earliest studies. Whereas the previous workshops dealt mostly with HT tools development and model case studies, EuroCombiCat 2009 clearly addressed the advantages and limitations of HT screening in the challenges facing today's chemical and fuel industries. Among the applications examined, we can cite homogeneous, heterogeneous and polymerisation catalysis, but also H<sub>2</sub> storage, solid oxide fuel cells and quantum dots materials.

Due to the significant and substantive developments in HT technology, the screening of the search space is performed over large

populations of candidates, instigating the discovery of elements with potentially unexpected, while interesting, properties. Under this scenario, HT technology becomes essential to rapidly identify the most promising formulations and reject the others. The subsequent reduction of the search space provides an excellent opportunity to tackle problems more rapidly and efficiently. The discussions at EuroCombiCat 2009 clearly showed that a rational and balanced use of HT screening and specific fundamental investigation is compulsory to enhance R&D efficiency. This can be achieved by integrating the disciplines required for synergistic teamwork. This is a new paradigm in the fields of Catalysis and Materials Science. Cutting-edge technologies applied in R&D centres have deeply modified the way in which experiments are designed and carried out. The tasks of scientists are evolving toward the capture of knowledge from a large database as well as toward the sharing of knowledge with other team members. Clearly, software to manage and share this knowledge will become increasingly important in large organisations.

Finally, the community has noticed that the subjects of HT tools and practices are generally not taught in universities. Although the fundamentals of catalysis and chemical processes remain the same, there is a growing gap between the typical university education and the current practices of R&D centres. This calls for the organisation of future Workshops!

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