SUSTAINABLE CHEMICALS MANAGEMENT – CONTRIBUTIONS AND GAPS

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A strategy for sustainable chemistry must include the three main fields of chemical activities: chemical substances, chemical processes and finished products. The evaluation of the whole life of chemicals and chemical products, e.g. applying tools like life cycle assessment (LCA) and substance flow management is a prerequisite for the promotion of sustainability in the chemicals sector. New marketing services - like chemical leasing - instead of products are measures to reduce amounts of chemicals used. Also, chemicals posing a risk to human health or the environment should be substituted by less hazardous ones. Consequently, inherently safe chemicals should be developed and promoted. The exigencies on sustainable chemical production and processing must include basic criteria, like less resource and energy demands, less releases of CO2, fewer discharges of toxic by-products, higher yields and less waste. Additionally, development and implementation of emerging alternative techniques like selective catalysis, biotechnology, micro-reactor techniques and energy input by ultrasonic treatment has to be promoted. Innovative technical approaches in process optimization can be promoted by development in the sectors of catalyser techniques, optimized cutting-off processes and solvents, microsystem techniques, bioengineering and nanotechnique.

In all countries a regulatory framework for a safe management of chemicals should be developed. Nonetheless, sustainable chemistry on a global scale is only possible if all stakeholders co-operate voluntarily. The new European chemical legislation REACH does contribute to sustainability of chemicals in many ways: Chemicals can only be marketed if it is proven that their identified use is safe. Information on hazardous properties of chemicals is generated and most hazardous chemicals posing a risk to human health or environment like CMR, PBT, vPvB substances must be authorized and will be under control. This will lead to long-term benefits on health of workers and consumers and the environment and consequently this will in turn reduce following costs. REACH also

generates more information and communication upstream and downstream the supply chain (e.g. via safety data sheets) and changes the burden of proof taking industry into responsibility. It also will help to reduce animal testing by data sharing and alternative approaches like (Q)SARs. Very importantly, REACH will drive innovation, e.g. through encouragement of market entrance for new chemicals by lower data requirements up to a production volume of 10 t/a. Therefore, innovative companies with high knowledge on their substances will benefit from REACH and will obtain advantage in competition.

Nonetheless, despite great achievement REACH covers not all aspects of sustainable chemistry. For example, the substitution of most hazardous substances is encouraged under REACH but not per se insisted on and REACH does not protect efficiently from hazardous chemicals released from imported articles. Although REACH contributes to improved confidence of consumers by better information of hazards and risks, there is no obligation to inform the consumers about all dangers. Therefore, safe chemicals according to REACH are not necessarily sustainable! Additionally, the question has to be addressed how resource demand can be reduced. A change from petrochemical to renewable feedstock for chemical production will significantly reduce resource demand, but bears the danger of unwanted consequences like devastation of rain forest for biomass production and the use of increased pesticides for cultivation.

Movement towards sustainability in chemical production and processes, as well as use and disposal of man-made chemicals is one of the most challenging requirements for mankind in the future. The talk gives an overview on various existing instruments and challenges for sustainable chemistry for future work on the basis of work done on different aspects.