TopCombi: Drive for faster, cleaner catalytic production routes

With 80% of all chemicals derived from catalytic processes, catalysis is seen as a vital industrial technology. Yet regulatory, environmental and competitive challenges require industry to access faster, safer & cheaper production routes. New approaches to catalysis are therefore needed for more efficient chemical synthesis, higher yields and near-zero-waste in safer, more energy-efficient processes.

TopCombi (Towards optimised chemical processes and new materials by Combinatorial science) is a Euro 23m., EU-funded programme providing for the development of these new routes - using high throughput technologies (HTT) and miniaturised research methodologies to find promising catalyst leads more quickly.

Launched in 2005, TopCombi is a 5-year project involving a consortium of 22 European partners, many of whom are industrial organisations, ensuring objective-driven research.

LGC is a core partner and Chemistry Innovation has a key remit to deliver knowledge transfer activity that will increase the productivity of catalyst research and lead to clear benefits across the UK chemical industry.

Catalysis research is part of TopCombi’s strategy to target urgent needs for sustainable energy, safe chemical products and processes and environmental protection. It seeks major acceleration of R&D from lab-to-pilot-to-industrial scale, using HT and micro technologies in sustainable chemistry and material science.

During 2007, LGC and Chemistry Innovation completed wide consultation to identify key needs of academia/industry associated with the adoption of HT catalyst research methods.

HT technology is seen as key to speeding up development of alternative reaction routes and includes parallel test reactors, automated synthesis platforms, miniature flow devices and data management and interpretation software solutions.

To exploit their potential, best practice in adoption of HT approaches in catalyst research workflows need to be shared, enabling higher quality results and optimum performance.

Accelerating this information flow and exchange is a key role for the LGC/Chemistry Innovation partnership.

DELIVERING KEY INDUSTRIAL BENEFITS

Long term benefits from HT-enabled delivery of innovative new catalysis routes include:

Reducing time to market by up to 50% by accelerating discovery and development of new catalytic processes necessary in the chemical industry over in the next 20 years.

Drastically reducing development costs of new high-performance catalytic materials to achieve potential breakthrough in catalytic processes.

Reducing waste/pollution by up to 50% through development of green catalytic processes, with zero or near-zero waste emissions and low energy consumption.

To reach the goal of increased productivity of catalyst research, management of HT-generated and standardized data is key.

During 2008, the Chemistry Innovation/LGC partnership will create work groups to develop data standards enabling easier management and sharing of information. This will allow development of more powerful tools to interpret the mass of data generated in HT experiments.

The partnership will also work with the TopCombi consortium to establish a targeted forum to share best practice in HT catalyst research.