

Engineering Advances in Combinatorial Chemistry Relevant to Heterogeneous Catalysis

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Introduction

Successful collaboration with SINTEF has delivered a portfolio of combinatorial systems consisting of catalyst synthesis, heat treatment, low-pressure and high-pressure vapor-phase test systems. In order to augment capabilities, proof-of-principle testing has been conducted to evaluate feasibility of a combinatorial-scale trickle-bed reactor. A novel integrated reactor design for mixed-phase and liquid-phase applications was considered. The effect of trickle bed reactor length vis-à-vis axial dispersion phenomenon was assessed. The power of the test has been demonstrated by comparing experimental and commercial catalysts. Ongoing proof-of-principle combining the trickle-bed reactor technology and Sulfur Management Strategies address high-throughput Hydrocracking and Hydroprocessing experimentation on the combinatorial-scale.

As industry leaders, UOP and SINTEF maintain active programs to further combinatorial applications relevant to heterogeneous catalysis and reactor development. In addition to the combinatorial-scale trickle-bed reactor, design kits have been developed to adapt the high-pressure sampling system. Implementation permits investigation of a wider range of reactor pressures and process chemistries.