

DSM Science & Technology Awards (NORTH) 2009	
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This PhD focused on solvent resistant nanofiltration (SRNF), an emerging membrane separation technology that allows to separate organic mixtures down to a molecular scale by simply applying a pressure gradient. SRNF offers a sustainable alternative for conventional liquid separation technologies in the processing of food products, pharmaceuticals, specialty chemicals and petrochemical refinery streams. The introduction of non-aqueous membranes for post-reaction separation will surely yield significant environmental and cost benefits in solvent-intensive processes.

In a first part, a new type of SRNF-membranes was developed, based on a completely novel concept to create well-defined porous structures by adding nano-sized zeolites to a polymer solution. A second aspect was the introduction of high-throughput experimentation and combinatorial strategies into the world of membrane technology, allowing rapid and reliable optimisation of membranes. Finally, the developed membrane concept was applied in catalytic reactions involving membrane-occluded metal colloids, while the SRNF membranes also allowed successful recovery of the homogenous catalysts from the reaction mixture.