

DSM Science & Technology Awards (NORTH) 2009	
Name	Wim de Malsche
University	Vrije Universiteit Brussel
Department	Department of Chemical Engineering
PhD Supervisor	Prof.Dr.Ir. G. Desmet/Prof.Dr. J.G.E Gardeniers

The thesis describes the development of a pillar array prototype that is ideally suited to apply in liquid chromatography. The pillars fabricated in silicon are highly ordered, in strong contrast with conventional particulate packed beds that are normally used as support structures. The increase in performance due to the order was demonstrated by injecting and separating plugs of coumarin mixtures through a C8-coated pillar array by means of reversed-phase liquid chromatography. Additionally, porous layers were developed to increase the interaction surface by a factor of several hundreds. Kinetic analyses have shown that separations in a pillar array can be a factor of 10 faster than in a conventional packed bed.

Apart from that, only very small volumes are needed for the analysis (nanoliters), which is of great value for the different life science fields such as genomics, proteomics, and metabolomics, where usually only limited sample volumes are available.