

## Bio-compatible polymers for enzyme screening

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Enzyme catalysis on substrates that are linked to polymers (polymer supported biocatalysis) is becoming increasingly important as polymer supported synthesis and high throughput screening methods are developed. Despite successes both in synthesis and analysis, fundamental understanding of the kinetics and thermodynamics of such enzyme catalysed reactions is limited. It is increasingly clear that the fundamental rules for solid phase chemistry are different from those of solution phase chemistry, and the same can be expected for solid phase biocatalysis. These rules need to be better understood in order to exploit the advantages of solid phase reactions in full. Hence, we recently initiated research efforts aimed at a better fundamental understanding of polymer supported biocatalysis.

We have obtained insight into the thermodynamics of amide hydrolysis reactions on polymer supports.<sup>1,2</sup> In addition, we gained a better understanding of the factors that govern accessibility of proteins to polymer beads. We have identified that poly (acrylamide(ethylene glycol)) copolymers (PEGA) as suitable polymers for reactions involving small proteins. All reactive sites on the polymer appeared to be accessible to thermolysin (35kDa) as analysed by Two Photon Microscopy (TPM).<sup>4</sup> For larger proteins, PEGA polymers modified with quaternary amines or sulphonates allowed for improved and controlled access of protein due to ionic interactions.<sup>3</sup>

1 R. V. Ulijn et al, *J. Am. Chem. Soc.* **2002**, *124*, 10988.

2 R.V. Ulijn et al, *Org. Biomolec. Chem.* **2003**, *1*, 1277.

3 A. Basso et al, *Chem. Commun.* **2003**, 1296.

4 R.V.Ulijn et al, *J. Combi. Chem.* **2003**, *5*, 215.