Electronic Supplementary Material (ESI) for Catalysis Science & Technology

ON-LINE SUPPORTING INFORMATION

Electro-enzymatic viologen-mediated substrate reduction using pentaerythritol tetranitrate reductase and a parallel segmented fluid flow system

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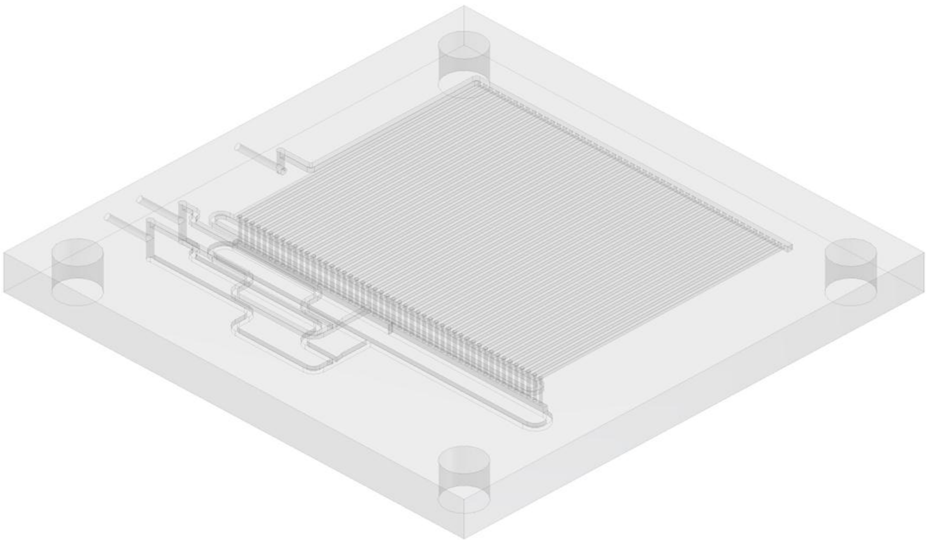
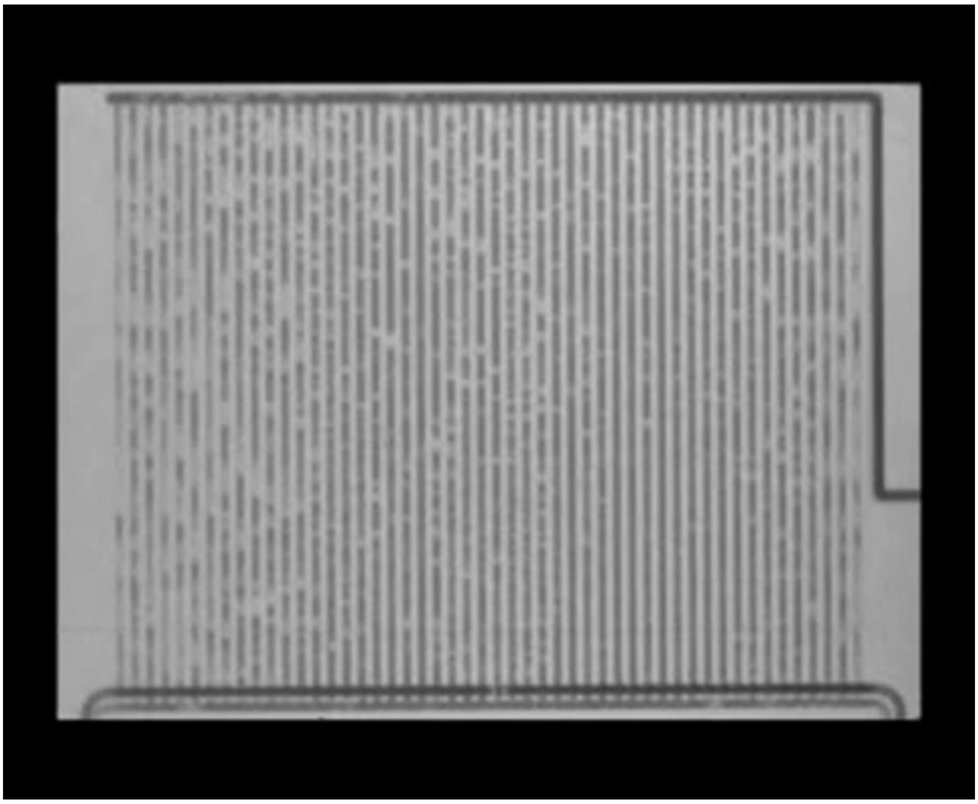
List of contents:

1. CAD design of fluidics device



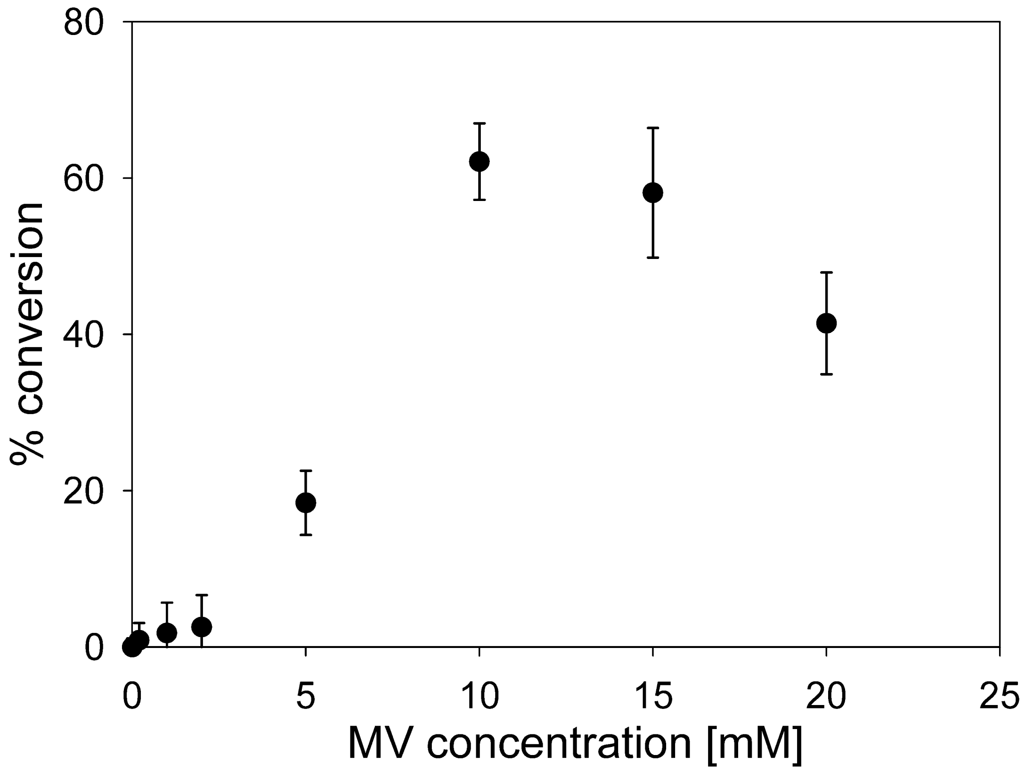
Supporting Information Figure S1: CAD design of the fluidic chip used in this study. For increased efficiency, both sides of the device have been machined to perform the initial droplet breakup (see main text for details) and re-joined into the main channel matrix via through holes.

2. Video of 50 channel chip in operation

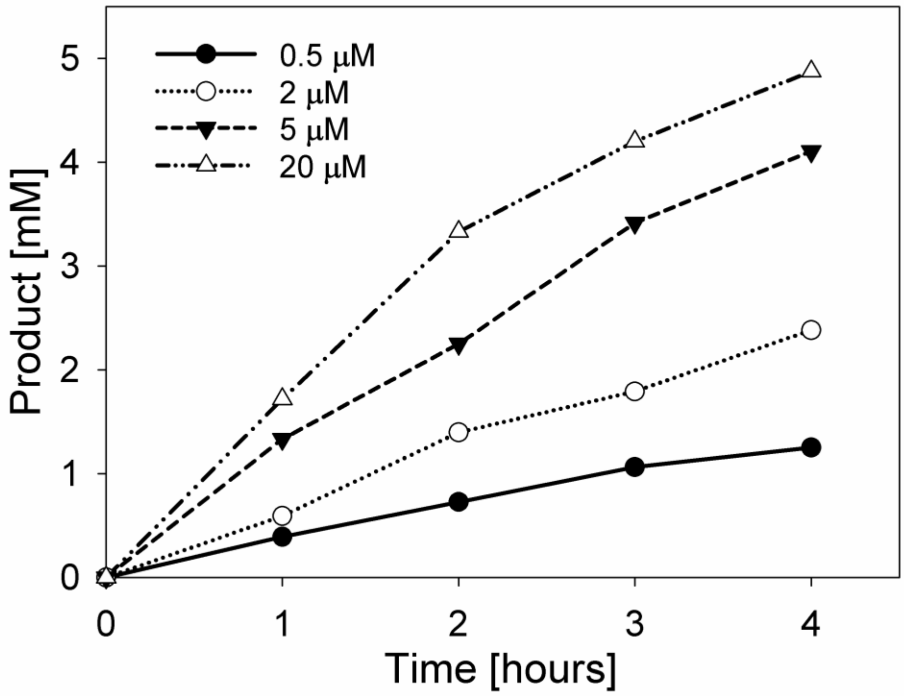


Supporting Information Figure S2:
Figure.S2 : Parallelised slug flow pattern in 50 channels. (Video)
Supporting Information video 1. (parallel biphasic flow.avi):

3. Enzyme and mediator dependence

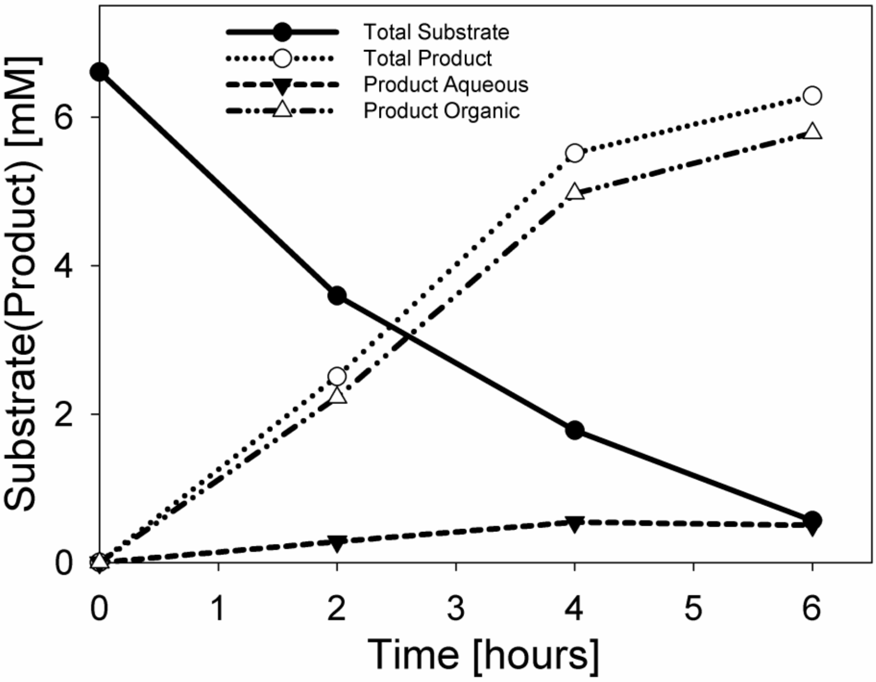


Supporting Information Figure S3:
Methyl viologen concentration dependence of the bioelectrocatalytic transformation of 2-cyclohexen-1-one by PETNR. The aqueous phase (10 mL) contained 50 mM KH_2PO_4/K_2HPO_4, pH 7.0, 50mM potassium bromide, 10 mM methyl viologen, and 2 µM PETNR. The organic phase (5 mL octanol) contained 5 mM 2-cyclohexen-1-one. Samples were taken from each phase after two hours and the % conversion at each concentration is plotted.



Supporting Information Figure S4:
PETNR concentration dependence of the bioelectrocatalytic transformation of 2-cyclohexen-1-one. Samples were taken from the organic and aqueous phases every hour and the total product plotted. The 10 mL aqueous phase contained 50 mM KH_2PO_4/K_2HPO_4, pH 7.0, 50mM potassium bromide, 10 mM methyl viologen, and 2 μM PETNR. The organic phase was 5 mL octanol containing 5 mM 2-cyclohexen-1-one.

4. Bioelectrocatalysis using TOYE



Supporting Information Figure S5:
Bioelectrocatalytic transformation of 2-cyclohexen-1-one by TOYE. Substrate consumption and product formation in the aqueous and organic phases are plotted as a function of time. The 10 mL aqueous phase contained 50 mM KH_2PO_4/K_2HPO_4, pH 7.0, 50mM potassium bromide, 10 mM methyl viologen, and 2 µM TOYE. The organic phase was 5 mL octanol containing 6.5 mM 2-cyclohexen-1-one