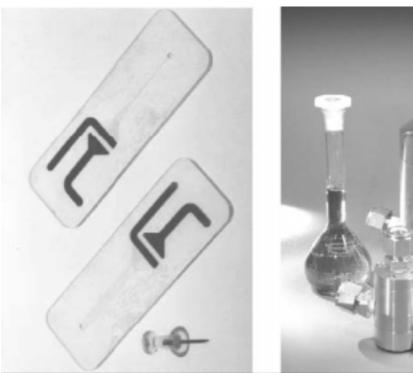
## Chemical microprocess technology – from laboratory-scale to production

Chemical microprocess							,	2004	Chemical
Engineering Science 59	Н.	Penne	mann,	V.	Hessel,	Н.	Löwe		"Chemical
microprocess technology – from labo	orate	ory-sca	le to p	rod	uction"				
Chemical microprocess									
screening									,
microprocess									
screening 가 .									
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(chip-based reacto					(m	icro	reacto	rs)	
,	가	•							
(microstructured reactors)		•							
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					, ch	emic	al m	icroproce	ess
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screening 가

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[ 1] Glass devices as examples for micromixers (left; typical flow rate: up to 3 dm $^3$  h $^{-1}$ ) and microstructured high throughput mixers (right; typical flow rates: up to 1 and 5m $^3$  h $^{-1}$ , respectively, at a pressure drop of 3 bar).

Faster and more reliable screening and facilitation of of in-depth

## kinetic studies

- Sequential combinatorial synthesis of pyrazoles
- High throughput catalyst screening and kinetic studies

## 'New' Chemistry

- Suzuki–Miyaura coupling
- Direct fluorination of aromatics and aliphatic reactants
- Photooxidation of dienes by singlet oxygen

<ul> <li>Synthesis of phenyl boronic aci</li> <li>Synthesis of azo pigments</li> <li>Monochlorination of acetic acid</li> </ul>			
Chemical microprocess		,	,
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가			singlet
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chemical microproc	eess		
. Dicarbonyl	가		Suzuki-Miyaura
coupling ,			
가 가	•		
Chemical microprocess		가	,
			. chemical
microprocess			
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가 .	falling fi	ilm	
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2003 ,	1 kg	propylene oxide	250
UOP 150,000			
. pilot		,	
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Fine chemical and functional chemical production