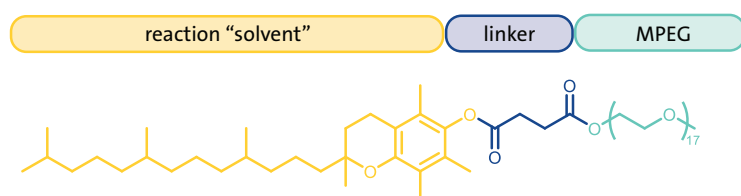


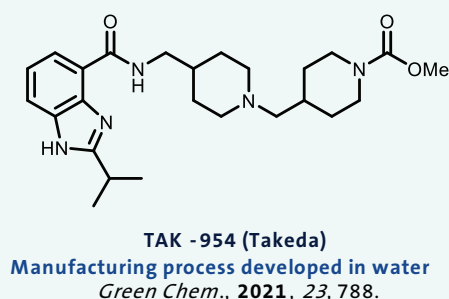
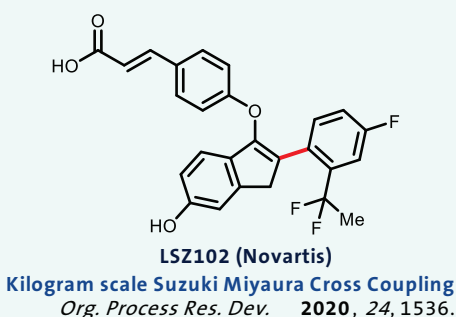
# Quick Start Guide to Micellar Catalysis

## GENERAL OVERVIEW



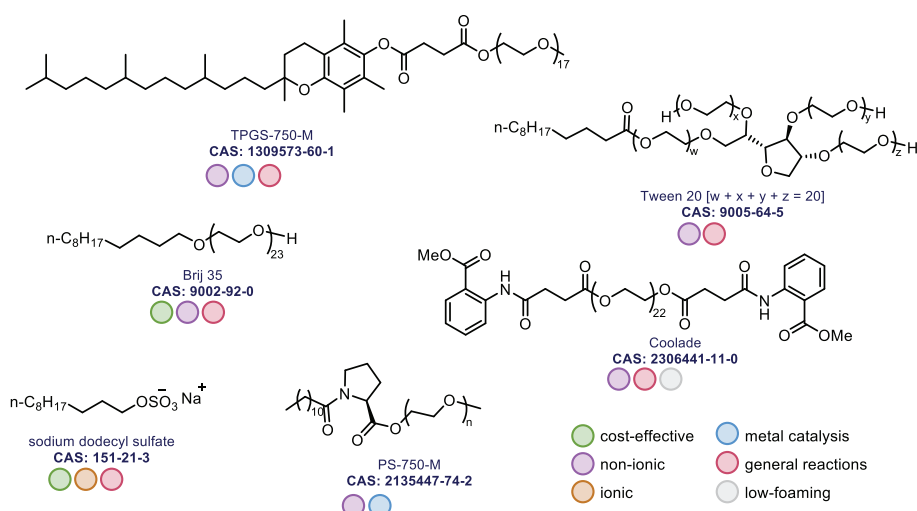
- ✓ Amphiphiles aggregate into micelles in water
- ✓ Mild reaction conditions
- ✓ Reduced organic solvent use
- ✓ Single reaction medium for different types of chemistry
- ✓ Potential for reduced catalyst loading (both metal and enzyme )

## RECENT INDUSTRY APPLICATIONS



## GETTING STARTED

### Commercially Available Surfactants



### Where do I begin?

- Many surfactants commercially available (Sigma -Aldrich)
- Can be purchased neat or in solution
- Start with 2 wt% in water (1 -5 wt% optimal)
- 0.1M to 0.5M reaction concentration is the most ideal
- For air -sensitive reactions, use degassed water (sparge with N<sub>2</sub>)
- Store in inert atmosphere (up to 6 months)

## REACTION SCREEN

Recommended Initial 12 Exp. Screen	No Surfactant (H <sub>2</sub> O)			2wt% TP GS-750-M	2wt% Brij 35
	1	2	3		
No co-solvent	A				
THF (15 vol%)	B				
Acetone (15 vol%)	C				
EtOH (15 vol%)	D				

Gauge reaction amenability with initial screen

### Things to Consider

#### Before Reaction

- ✓ Choice of Surfactant
- ✓ Amount of co -solvent (5 -20%)
- ✓ Dosing rate of reagents
- ✓ Temperature (above 60°C may degrade surfactant)
- ✓ pH (extreme pH may degrade surfactant)
- ✓ Lipophilicity of reagents

#### Work-up

- ✓ Direct -drop crystallization
- ✓ Product precipitation *via*
  - H<sub>2</sub>O addition
  - Co-solvent evaporation
- ✓ Extractive work -up
- ✓ Traditional crystallization

### Insider Knowledge

- ✓ Vigorous stirring is key! (barring biocatalysis)
- ✓ Avoid splashing above solvent level
- ✓ For most cases, surfactant solution should be added last
- ✓ For reaction monitoring, remove aliquot while reaction is stirring

### Disadvantages

- Insufficient solubility of substrate
- Hydrolysis of highly reactive intermediates
- Challenges with some heterogeneous reaction mixtures
- Large quantities of solvent use during extraction may negate environmental benefits

## REACTION TYPES

olefin metathesis	peptide couplings	biocatalysis	Heck coupling	Stille coupling
Suzuki -Miyaura	S <sub>N</sub> Ar	C -H activation	tandem reactions	reductive amination
Sonogashira	Nitro reductions	Buchwald -Hartwig Amination		