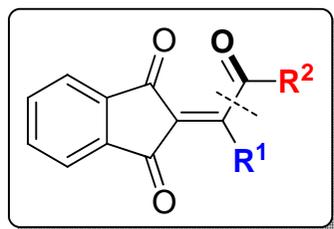
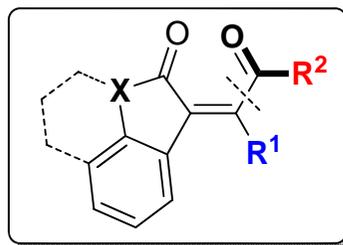


# Phosphine-catalyzed reactions



or

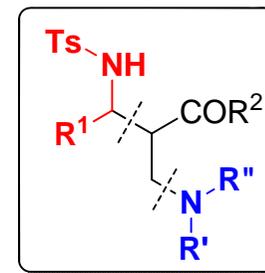


$R^1 = \text{Aryl}$ ;  $X = \text{C}$  ( $sp^2$  or  $sp^3$ ),  $\text{N}$ , or  $\text{O}$   
 $R^2 = \text{Aryl}$  or  $\text{Alkyl}$  (including  $\text{CF}_3$ )

*Chem. Commun.* **2014**, 50, 5304-5306

*Michael addition /  
acylation / acyl  
group transfer*

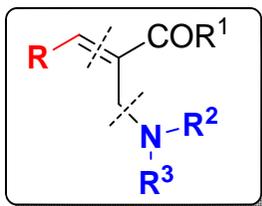
$R^2\text{COCl}$   
+ cat.  $R_3\text{P}$  +  $\text{Et}_3\text{N}$



87-95% yields  
(dr = 83:17 to >99:1)  
*J. Org. Chem.* **2011**,  
76, 2888-2891

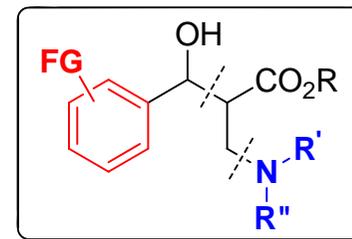
$R_3\text{P}$ -catalyzed  
Tandem three-  
component  
reaction: *Morita-  
Baylis-Hillman  
reaction /  
Michael addition*

$R_3\text{P}$ -catalyzed *Morita-  
Baylis-Hillman  
reaction / Michael  
addition / elimination*



(within 3-29.5 h)  
68 to 99% yield  
*E/Z* up to 98:2

*Org. Biomol. Chem.* **2011**, 9, 363-366



*Tetrahedron Lett.*  
**2010**, 51, 5943-5946  
*Molecules* **2012**, 17,  
2529-2541