Electrophiles for Electrophilic Aromatic Substitution (EAS) (Starkey Ch. 5.1)

EAS Reaction	Conditions	Electrophile (E+)	Mech. to make E+ (1st steps in EAS)
halogenation –X	$Br_2/FeBr_3$	$Br^{\oplus}$	great LG; $\delta-$ $\delta+$
	$Cl_2/FeCl_3$	$Cl^{\oplus}$	
nitration –NO_2	HNO_3, H_2SO_4	$O=N=O^{\oplus}$	great LG
sulfonation* –SO_3H	SO_3, H_2SO_4		great LG; **reaction is reversible (heat removes -SO_3H group)*
Friedel-Crafts alkylation –R	ROH/HA *or* ROH/BF_3 *or* RX/FeX_3 *or* + HA (HF)	$R^{\oplus}$ (carbocation)	great LG; $\delta+$ $\delta-$
Friedel-Crafts acylation	+ $AlCl_3$ *or*	$R-C\equiv O^{\oplus}$ (acylium ion)	great LG
	+ $AlCl_3$		
formylation	CO, HCl, $AlCl_3$ (Gattermann-Koch)	$H-C\equiv O^{\oplus}$ (acylium ion)	etc. $AlCl_3$

formyl chloride formed in situ