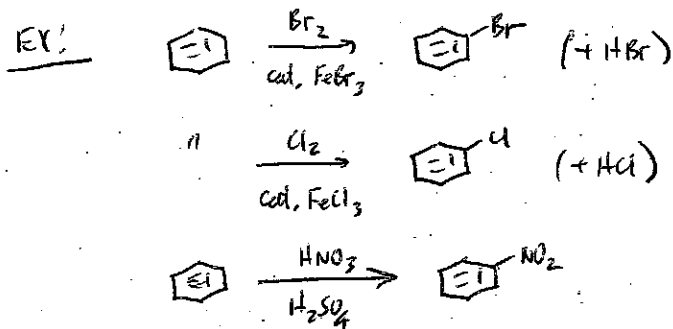


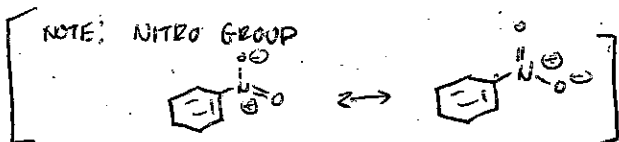
Submit a *Single-sided Copy* to the Office  
DO NOT STAPLE

RECALL: ELECTROPHILIC AROMATIC SUBSTITUTION (EAS)

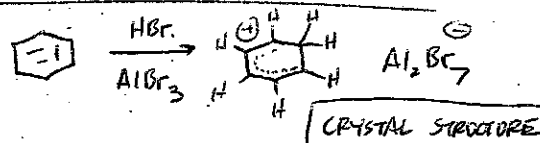
- REQUIRES VERY REACTIVE ELECTROPHILE (TEMPORARY LOSS OF AROMATICITY)
- DIFFERENT ELECTROPHILES LEAD TO DIFFERENT KING SUBSTITUENTS



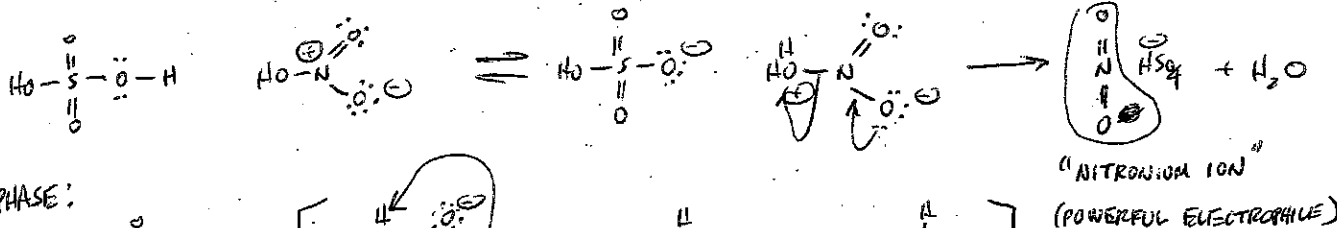
ALWAYS DRAW RESONANCE STRUCTURES FOR REACTIVE INTERMEDIATES



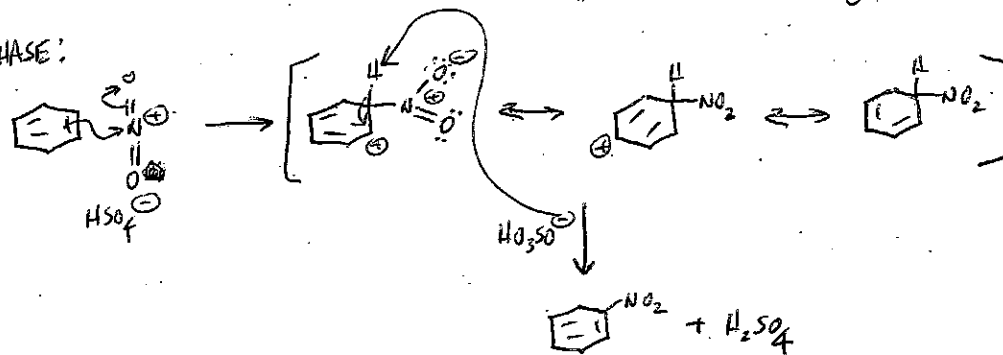
PAPER ON COURSE WEBSITE  
ANSWER CHEM INT ED 53, 1689 (2004)



GENERATION OF ELECTROPHILE:

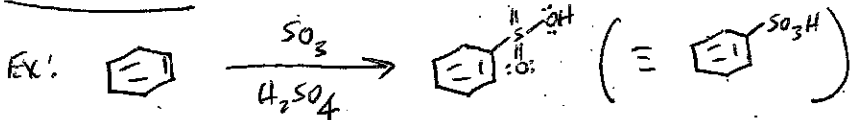


EAS PHASE:

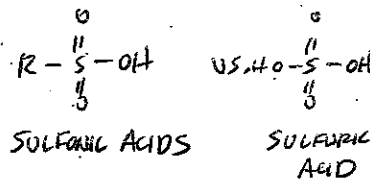


Submit a *Single-sided Copy* to the Office  
DO NOT STAPLE

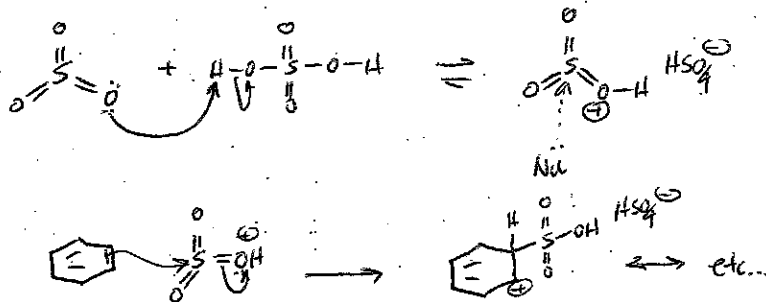
SULFONATION



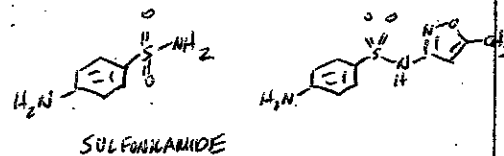
IN GENERAL, A SULFONIC ACID HAS THIS STRUCTURE:



MECHANISM:

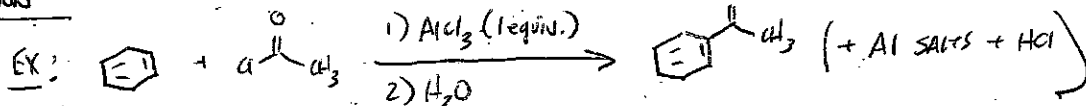
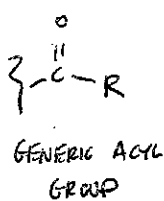


YOU COMPLETE THE MECHANISM

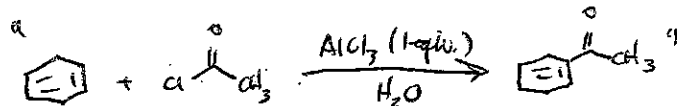


RELATED FAS RXNS ARE CRUCIAL FOR SYNTHESIS OF "SULFA DRUGS"  
FIRST (SYNTHETIC) ANTIBIOTICS INVENTED IN GERMANY IN 1930'S

FRIEDEL-CRAFTS ACRYLATION



NOTE: NEW C-C BOND FORMED!



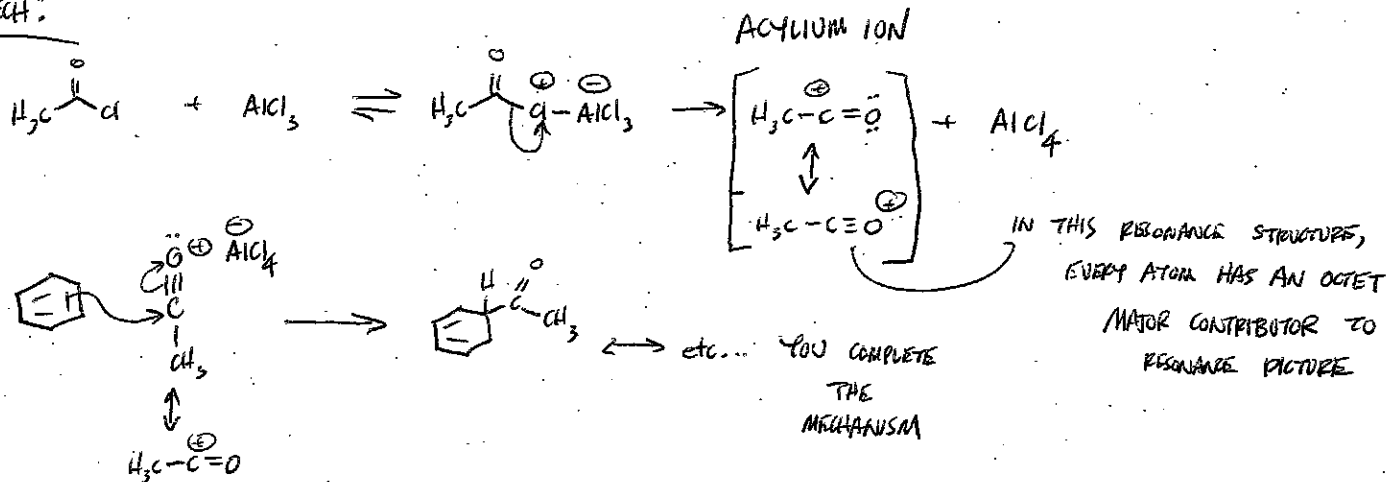
NOTE: 2 DISTINCT STEPS FOR THIS CHEMICAL PROCESS

NON SENSE

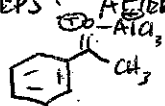
- $\text{AlCl}_3$  REACTS WITH  $\text{H}_2\text{O}$
- INSTEAD, WRITE  $\xrightarrow[2) \text{H}_2\text{O}]{1) \text{AlCl}_3 (\text{equiv.})}$

Submit a Single-sided Copy to the Office  
DO NOT STAPLE

MECH:



WHY 2 STEPS? AFTER STEP 1,



THIS IS WHY WE NEED A FOUR EQUIVALENT OF  $AlCl_3$  FOR THE RXN

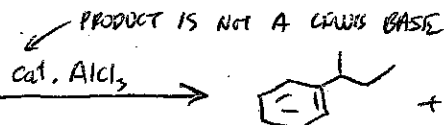
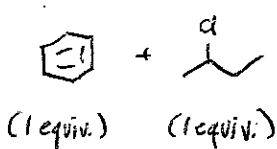
BECAUSE THIS CA-LB COMPLEX IS VERY STABLE,

- 1) WE NEED 1 EQUIVALENT OF  $AlCl_3$
- 2) WE MUST ADD  $H_2O$  AFTER FAS COMPLETE TO DESTROY CA-LB COMPLEX

NOTE: TYPO IN STRUCTURE AT TOP OF PG. 761 → MISSING OXYGEN

FRIEDEL-CRAFTS ALKYLATION

EX:



DIAALKYLATED BENZENES  
 + HIGHER ALKYLATION PRODUCTS  
 + RESIDUAL BENZENE

} OVER  
 COMPLEX  
 PRODUCT  
 DISTRIBUTION

NOTE: THIS PROCESS DIFFERS FROM ALL OTHER FAS EXAMPLES IN THAT MULTIPLE SUBSTITUTIONS OCCUR READILY