## Lecture 24A • 03/26/12

[final review]
[nomenclature – alcohols, alkoxides, alkenes, aldehydes, ketones, benzene]
[conversion of alcohols to leaving groups – tosyl chloride, thionyl chloride, phosphorus tribromide; stereochemical consequences]
[reactions of alcohols – hydration, dehydration; oxidation – PCC versus $CrO_3$, primary versus secondary versus tertiary; pinacol rearrangement]
[alkoxide formation – Na, NaH; Williamson ether synthesis]
[reactivity of aldehydes vs ketones]
[reactions of aldehydes and ketones: POAD – hydrates, acetals, ketals, hemiacetals, hemiketals, imines, enamines, cyanohydrins, oximes, hydrazones]
[reactions of aldehydes and ketones: reduction – $NaBH_4$ vs $LiAlH_4$; alkylation – Grignard, Wittig; hydrazones – Wolff-Kishner reduction]
[protecting groups – DHP, TBDMSCl]
[epoxides: formation – MCPBA, $Br_2/H_2O$ then NaH; ring opening – cationic versus anionic]
[conjugation – allyl, buta-1,3-diene; cumulated dienes; bonding, non-bonding, antibonding]
[aromaticity – aromatic, non-aromatic, antiaromatic; cyclobutadiene, benzene, COT]

Boron and nitrogen. It's aromatic. What's the hybridization of every boron? sp2, automatically. Remember, the lone pairs, when they want to or can delocalize, they do, so what's the hybridization of each nitrogen? Also sp2. Every position is sp2 and the lone pairs are the only electrons that delocalize, but there's six of them. That means this molecule is cyclic, planar, conjugated, it's got the right number of electrons; it's aromatic, but no carbon involved.

Cyclopropene is aromatic. It's got amazing angle strain, but it exists. Stable is a word that means a lot of things. Borane exists, and yet it's stable, but it's not, it's reactive, but it exists, so is it stable or not?

[cyclopropenium ion – angle strain or aromaticity]
[benzene synthesis – nitration, sulfonation, alkylation, acylation, and halogenation]
[pericyclic reactions – frontier orbital theory; ground versus excited states; conrotatory vs disrotatory cyclizations]
[Diels-Alder reaction – s-cis versus s-trans; endo versus exo; secondary orbital effects]