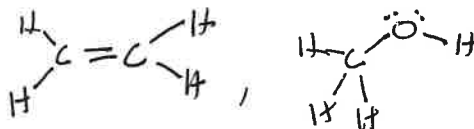


Course 343 Lecturer Sam Gellman  
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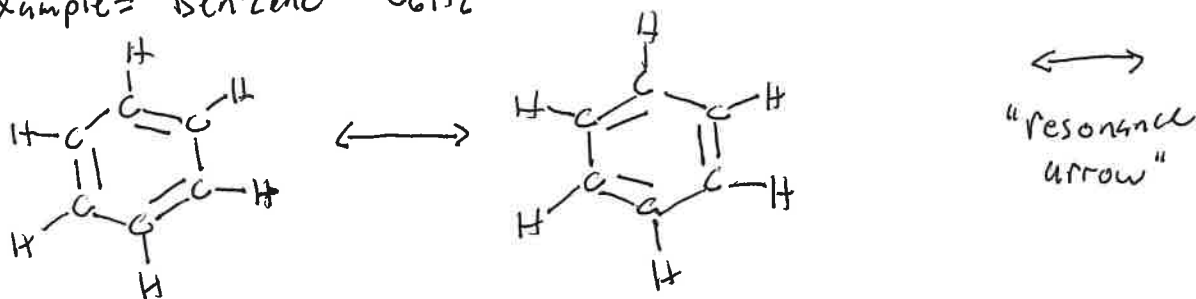
Recall: Introduction to bonding in organic molecules via simple principles, such as



These images imply "localized bonding", each line indicates 2e<sup>-</sup>'s shared between 2 atoms

Sometimes the notion of localized bonding is "inadequate"  
 → Resonance structures

Example = Benzene C<sub>6</sub>H<sub>6</sub>

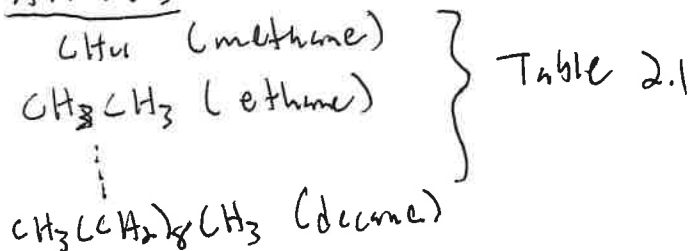


## Chapter 2 - Alkanes

Molecules containing C and H bonds w/ single bonds only

Rec. Problems: 1, 3-5, 11-15, 17, 18, 23, 24, 27, 29, 30, 33, 35-41,  
 46-50

### Alkanes



Course 343

Lecturer Sam Gellman

Day Monday

Date 9-12-16

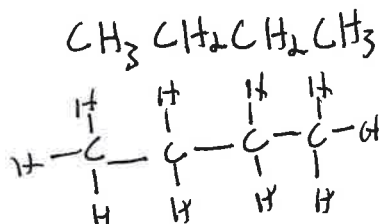
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Drawing conventions

C<sub>4</sub> linear  
alkane  
(butane)

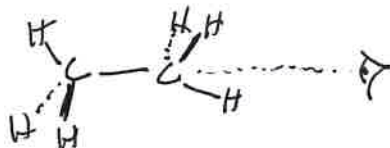


or  "skeletal"

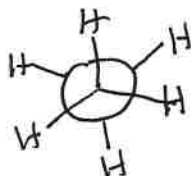
Alkane Conformation ("shapes")

Focus → rotation about C-C bonds

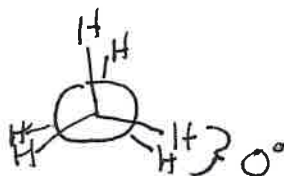
consider ethane



Newman Projections:



vs.

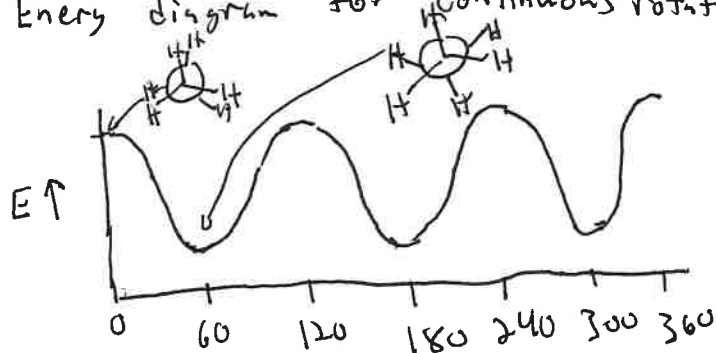


"staggered  
conformation"

"eclipsed  
conformation"  
(high energy)

(low energy)

Energy diagram for continuous rotation about  $\text{CH}_3\text{—CH}_3$



Min energy = stable conformations

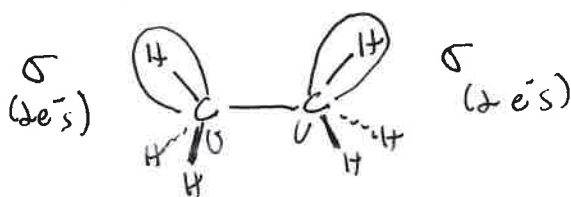
Max energy = transition states.

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Why is staggered conformation lower in energy than eclipsed?

2 hypothesis

1) Repulsion between filled MOs <sup>maximized</sup> ~~minimized~~ in eclipsed



2)  $\sigma \rightarrow \sigma^*$  e<sup>-</sup> delocalization is favorably maximized in staggered conformation.



Conformational analysis of butane → Focus on central C-C bond

