Fropylium ion
Bonding orbitals are exactly filled, so system is favorable.

\[ \text{tropylium ion} \]

Aromatic (cyclic, planar, conjugated, lone) For a frost circle, a decagon would be inscribed.

Stability of benzene

\[ \begin{align*}
1 \text{H}_2 \xrightarrow{\text{Pd}} & \ \ \ \Delta H_{\text{rxn}} = -120 \text{ kJ/mol} \\
2 \text{H}_2 \xrightarrow{\text{Pd}} & \ \ \ \Delta H_{\text{rxn}} \text{ (predicted)} = -240 \text{ kJ/mol} \\
3 \text{H}_2 \xrightarrow{\text{Pd}} & \ \ \ \Delta H_{\text{rxn}} \text{ (actual)} = -232 \text{ kJ/mol} \\
& \ \ \ \mid \Delta H_{\text{rxn}} \mid = 8 \text{ kJ/mol} \\
& \ \ \ \Delta H_{\text{rxn}} \text{ (predicted)} = -360 \text{ kJ/mol} \\
& \ \ \ \Delta H_{\text{rxn}} \text{ (actual)} = -208 \text{ kJ/mol} \\
& \ \ \ \mid \Delta H_{\text{rxn}} \mid = 152 \text{ kJ/mol}
\end{align*} \]

Quiz #3 3/7/12

The fact that benzene releases less energy than predicted means it is lower in energy to begin with ("stable").
**Nomenclature**

Common names (ortho, meta, para)

- toluene
- o-xylene
- m-xylene
- p-xylene
- phenol
- anisole
- acetophenone
- phenone

Whenever a molecule can be numbered equally in two ways, the lowest # is given to the substituent that is lower alphabetically.

l-ethyl-3-methylbenzene

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**Electrophilic Aromatic Substitution**

\[
\text{E}^+ \rightarrow \text{Cyclic Intermediate} \rightarrow \text{E} \rightarrow \text{Product}
\]

Nitration

Violates actet rule

\[
\text{Nitration} \rightarrow \text{Cation} \rightarrow \text{Nitration Product}
\]

- \( \text{H}^+ \rightarrow \text{N}^+ \)
- \( \text{H}_2\text{O}^+ \)