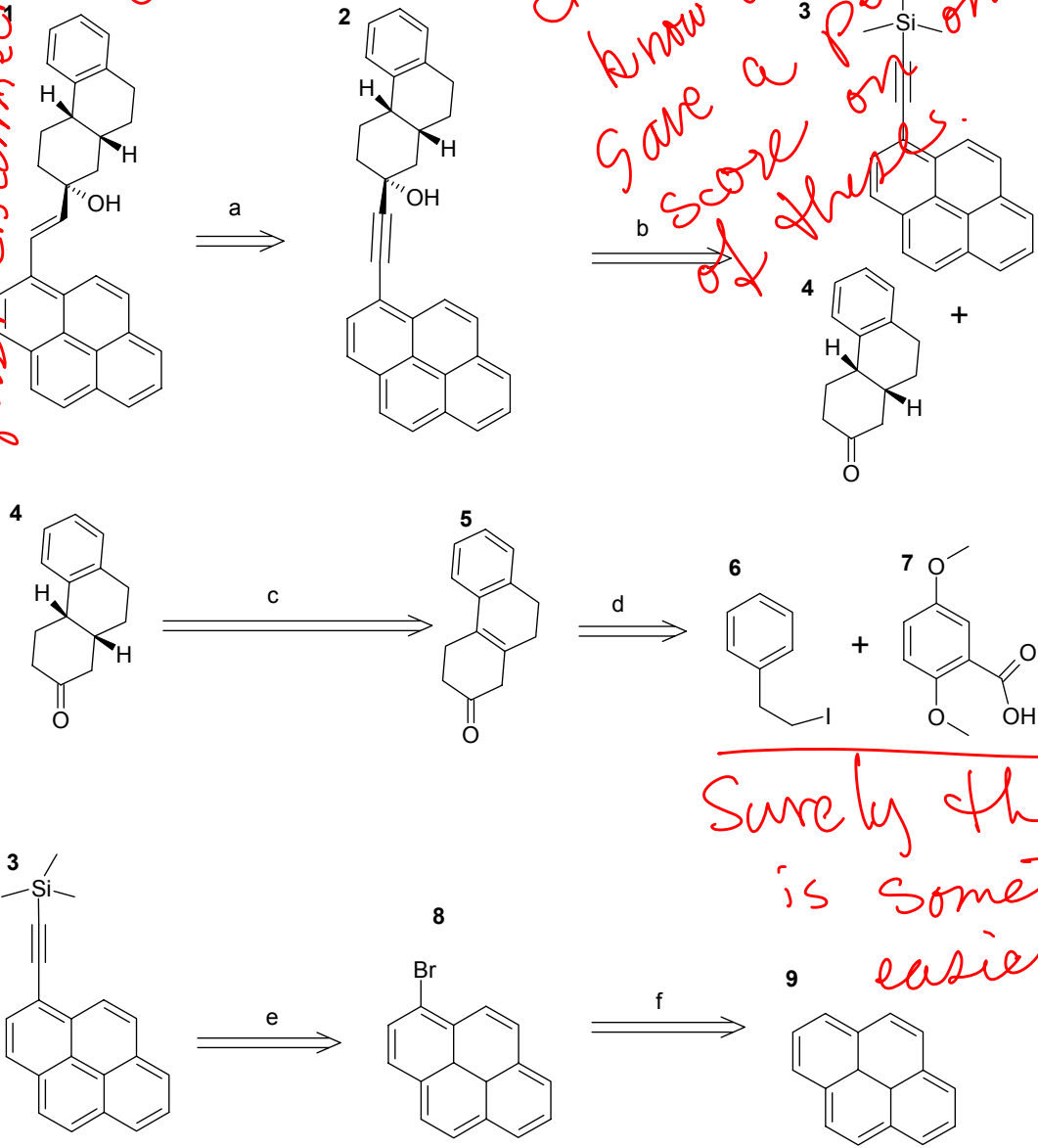


Retrosynthesis 1

well! you are progressing  
start a discussion  
of retrosynthesis

based on strategy  
why did you  
choose the  
first disconnection  
? - etc.



Wow! 25/25 😊  
I do not know when I ever gave a perfect score on one of these.

You work was well-documented!  
I am impressed!  
Finish the semester Strong!  
Dr. Camm

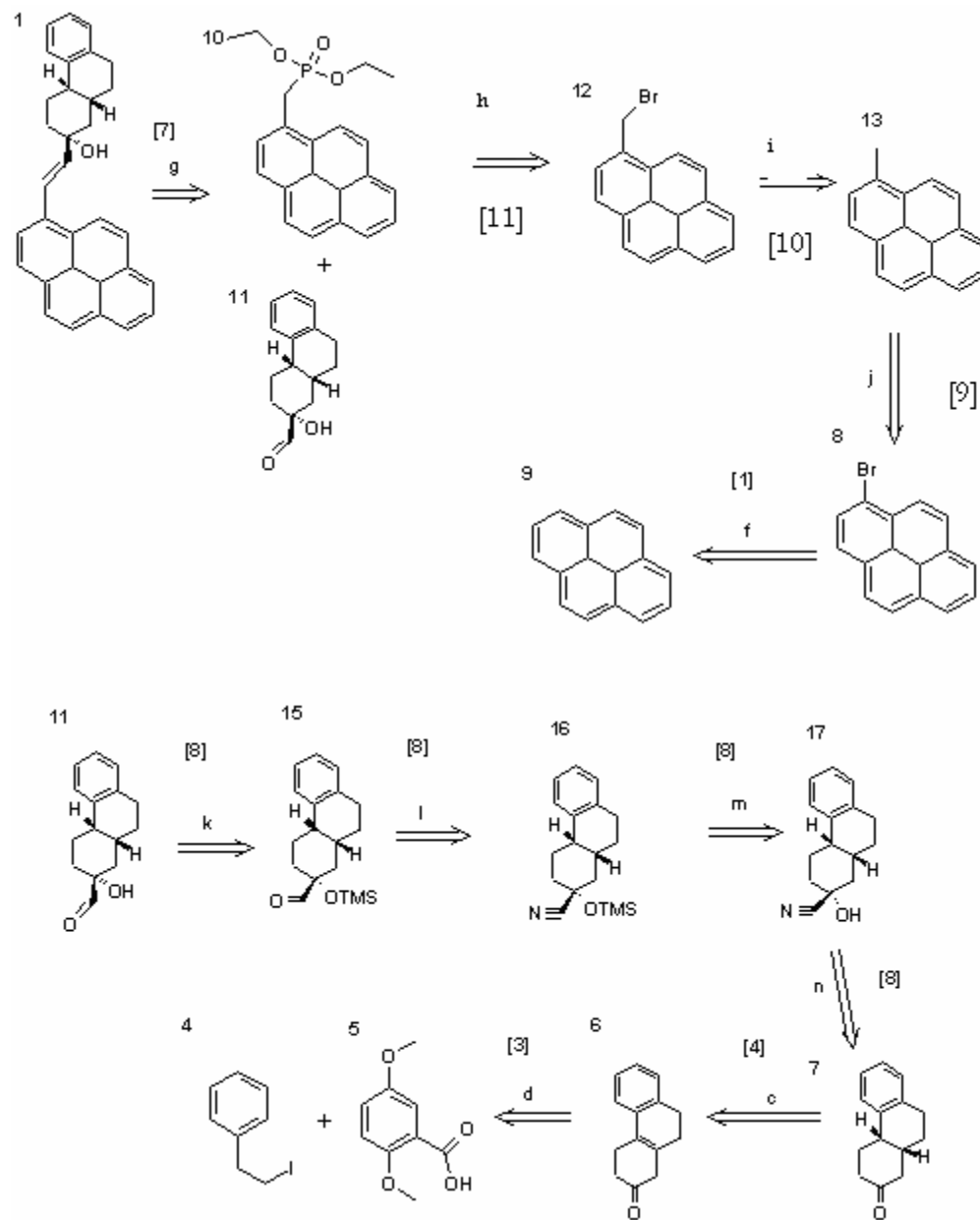
Surely there is something easier.

The synthesis begins with the mono bromination of **9** which was a good staging point to use the sonogashira coupling; the coupling between alkynes and vinyl halides to yield **3** which is saved to be used convergently with the product from reaction c later in the synthesis. Reaction d was a lithium catalyzed reduction followed by an alkylation of **7** with **6** to yield **5**. The double bond of **5** was then reduced to an alkane. Reaction b was the convergent point where **3** alkylated at the carbonyl carbon of **4**. The alkyne

I will ding you for this next time.

of **2** was then reduced to yield an E enolate. References and further details of the reaction will be explained in the forward synthesis on page 3.

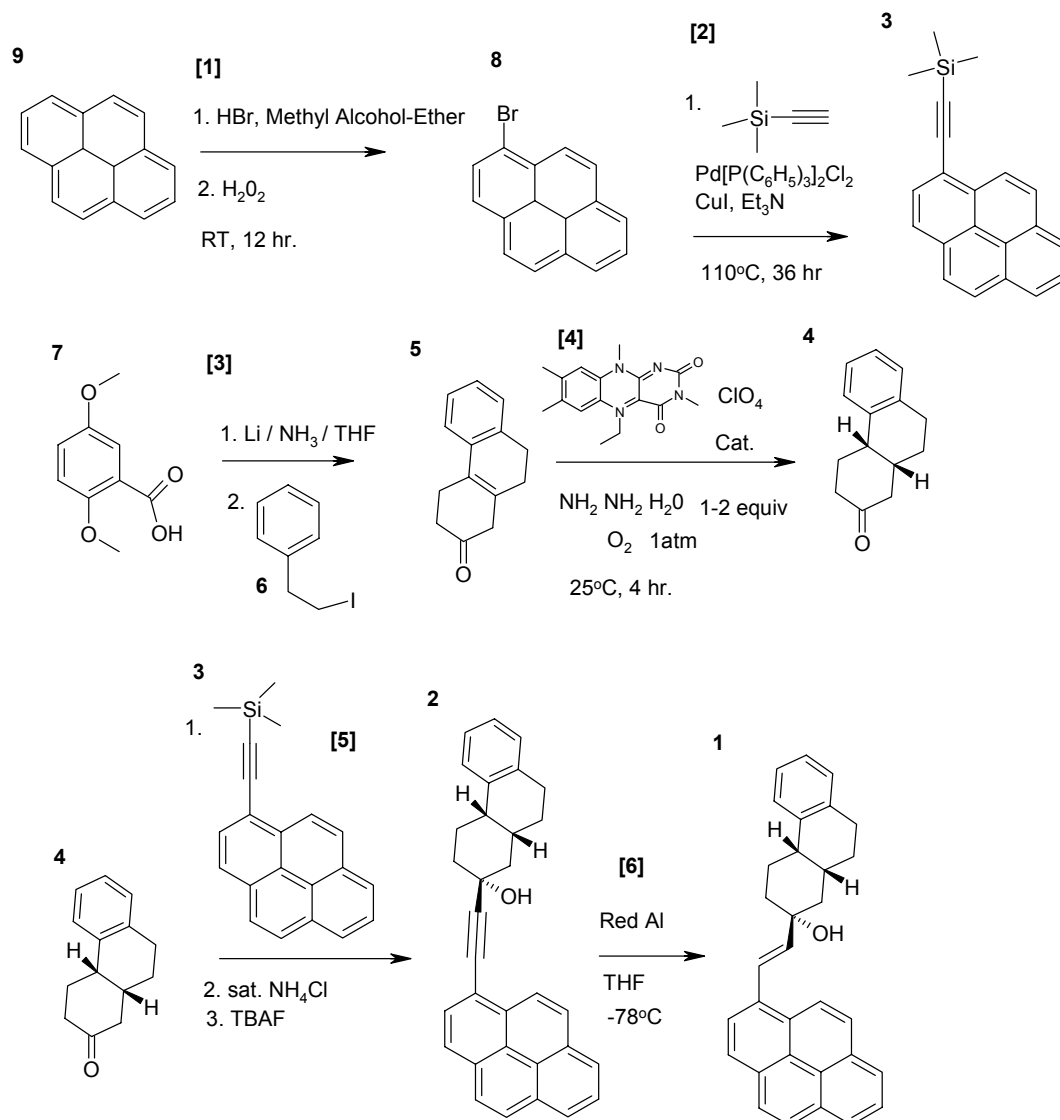
### Retrosynthesis 2



**7** was made in the same way as in retrosynthesis 1. [3,4] The difference was the nucleophilic attack of cyanide at the carbonyl carbon of **7** [8], reaction **n** also contained TMS which was used to protect the hydroxyl group. Reaction **m**; involved the reduction of cyanide to an aldehyde with DIBAL-H. [8] The hydroxyl was deprotected to yield **14** which would be used at the convergent point of the synthesis reaction **g**. In the literature [8], the deprotection of the hydroxyl gave a 60% yield

which was one reason why I prefer retrosynthesis 1. In the second portion of the convergent synthesis **9** was created in same way as seen in retrosynthesis 1. [1] The 1 bromo pyrene was then converted to **13** [9] followed by a bromination to yield **12**. [10] The bromine was displaced by P(OCH<sub>2</sub>CH<sub>3</sub>)<sub>2</sub>O via Michaelis-Arbusov rearrangement [11] to setup for a nice horner Emmons reaction between **11** and **10** combines them at the newly formed trans alkene to yield **1**. [7] The extra steps to yield **12** seemed less efficient giving another nod to retrosynthesis 1.

### Forward synthesis of Retrosynthesis 1



**9** was mixed in solution with hydrobromic acid in methyl alcohol-ether and hydrogen peroxide was then slowly added and then left at room temperature for 12 hours. [1] **8** was then subjected to a standard sonogashira reaction displacing the bromine with the addition of an alkyne attached to TMS at 110°C for 36 hours to yield **3**. [2]

**7** was reduced via birch reduction and then was used to alkylate **6** following its addition to the reaction. <sup>[3]</sup> **5** was then reduced via catalytic amounts of the diimide with 1 equivalent of hydrazine and 1 equivalent of O<sub>2</sub>. <sup>[4]</sup> The stereochemistry of the hydrogenation can be controlled when looking at spatial considerations when thinking of trying to hydrogenate from the concave side of **5**. The carbonyl carbon of **4** was then attacked nucleophilically by the alkyne carbanion of **3**. <sup>[5]</sup> The stereochemistry was also controlled when looking at spatial considerations from the attack of a nucleophile which is far easier on the convex side of **4** as opposed to the concave side. Finally the alkyne was reduced by Red-Al which was efficient in producing a good yield (86%) of E alkene to yield **1**. <sup>[6]</sup>

As stated previously, Retrosynthesis 2 seemed less efficient in the synthesis of **1**. Its use of protecting groups is always something that one should avoid when trying to synthesize a compound and its relatively low yield after deprotection made it quite unfavorable. Also there were overall more reactions in the entire synthesis compared to Retrosynthesis 1 which leads to a greater use of time, money etc.

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Note: I could not find a copy of reference 10, it was not in CP nor did UK have an online subscription. I relied on the information Scifinder gave me; I know better!