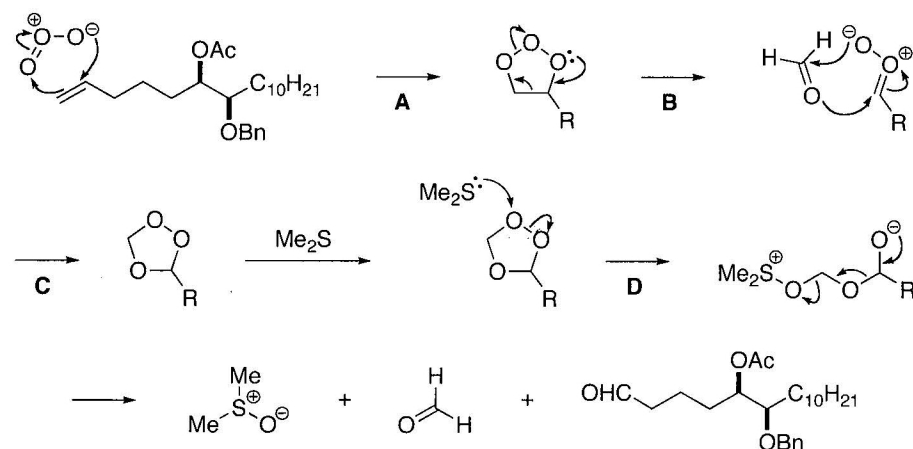


Kono, H.; Hooz, J. *Org. Synth., Coll. Vol. VI* **1988**, 919.

A: Hydroboration through a four-membered transition state. **B:** Attack of a hydroperoxide anion to the borane to form an ate complex. **C:** Migration of an alkyl group. **D:** Hydrolysis of the borate.

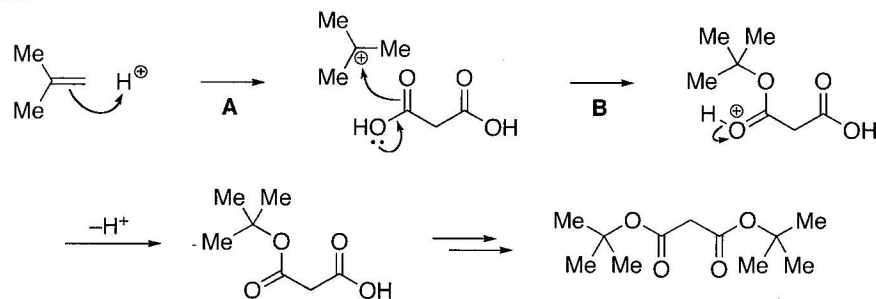
A029



Ko, K.-Y.; Eliel, E. L. *J. Org. Chem.* **1986**, 51, 5353.

A: 1,3-Dipolar cycloaddition of ozone to the olefin. **B:** Heterolytic cleavage of the initial ozonide. **C:** Recombination of the resulting 1,3-dipole and the aldehyde to form an ozonide. **D:** Reductive cleavage of the O-O bond of the ozonide with Me₂S.

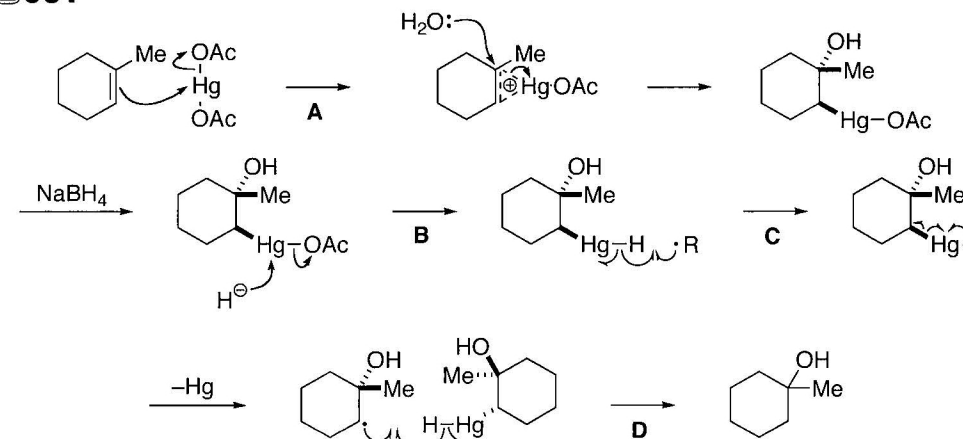
A030



McCloskey, A. L.; Fonken, G. S.; Kluiber, R. W.; Johnson, W. S. *Org. Synth., Coll. Vol. IV* **1963**, 261.

A: Protonation of isobutylene to form a stable tertiary carbocation. **B:** Attack of a carboxylic acid to the carbocation.

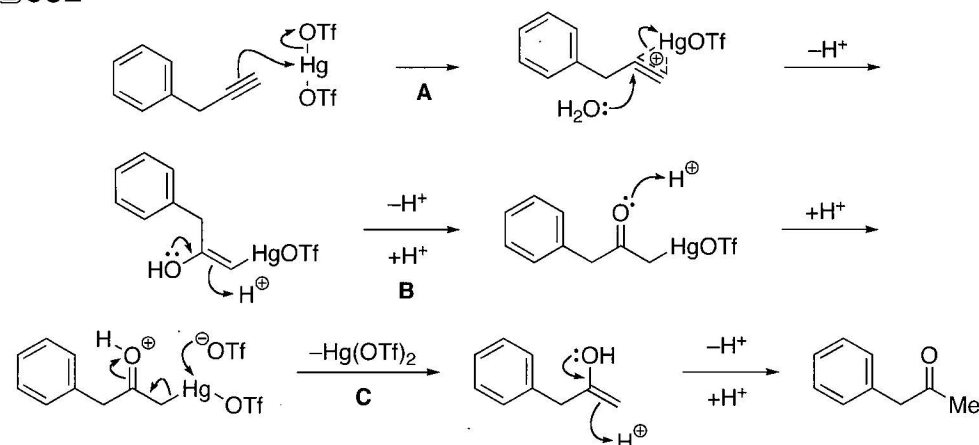
A031



Jerkunica, J. M.; Traylor, T. G. *Org. Synth., Coll. Vol. VI* **1988**, 766.

A: Oxymercuration of the olefin. **B:** Reduction with NaBH₄ to form a Hg-H bond. **C:** Cleavage of the Hg-H bond followed by extrusion of Hg to form a secondary carbon radical. **D:** Abstraction of a hydrogen atom.

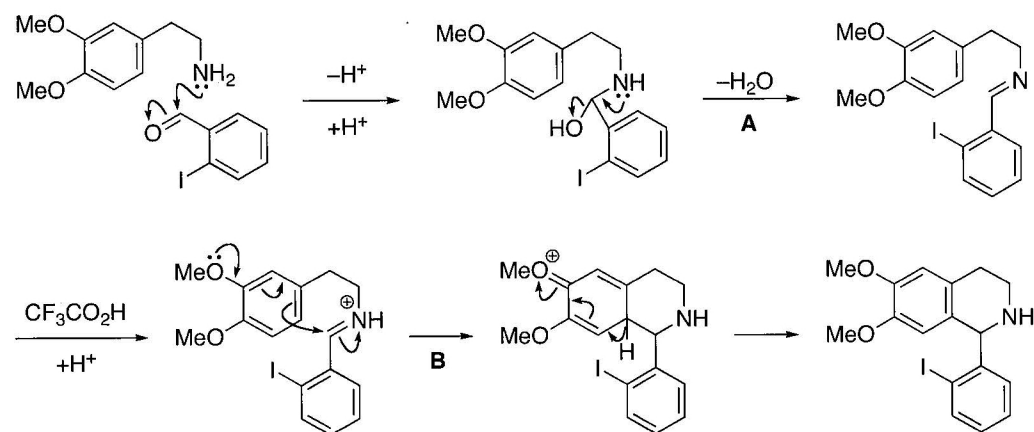
A032



Nishizawa, M.; Skwarczynski, M.; Imagawa, H.; Sugihara, T. *Chem. Lett.* **2002**, 12.

A: Oxymercuration of the alkyne. **B:** Tautomerization of the enol. **C:** Demercuration to regenerate Hg(OTf)₂.

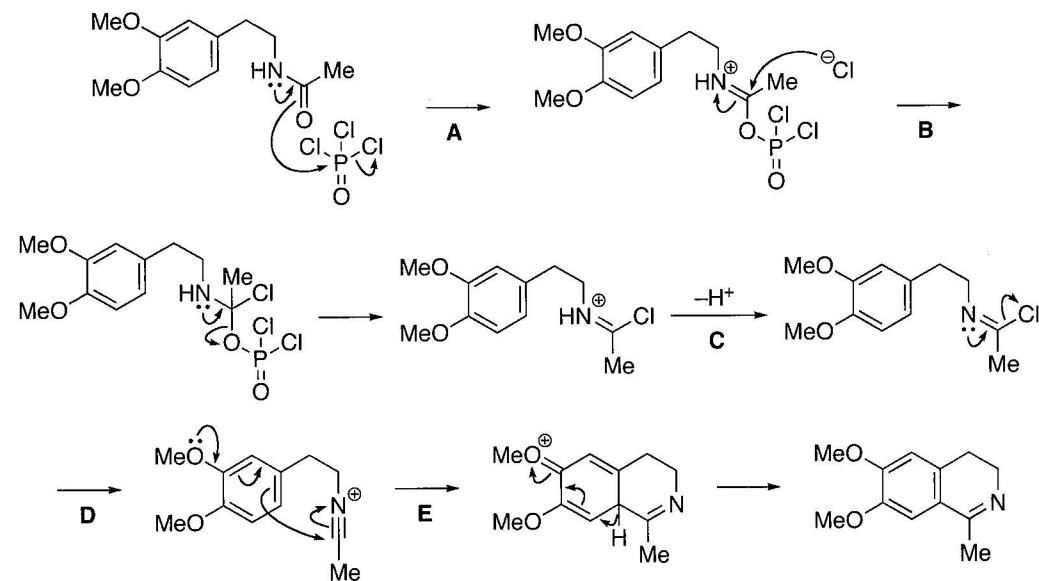
A033



Whaley, W. M.; Govindachari, T. R. *Org. React.* **1951**, 6, 151.

Pictet-Spengler reaction. **A**: Formation of an imine. **B**: Addition of an electron-rich aromatic ring to the iminium ion followed by aromatization.

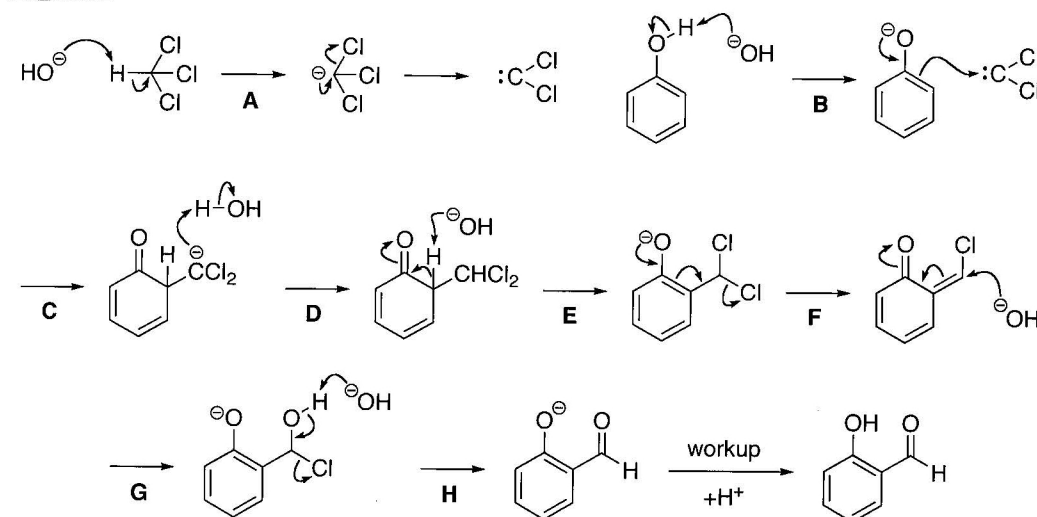
A034



Brossi, A.; Dolan, L. A.; Teitel, S. *Org. Synth., Coll. Vol. VI* **1988**, 1.

Bischler-Napieralski reaction. **A**: Attack of the oxygen atom of the amide to POCl_3 . **B**: Addition of chloride ion followed by elimination of dichlorophosphate ion. **C**: Deprotonation. **D**: Elimination of chloride ion to form a nitrilium ion. **E**: Attack of an electron-rich aromatic ring to the nitrilium ion.

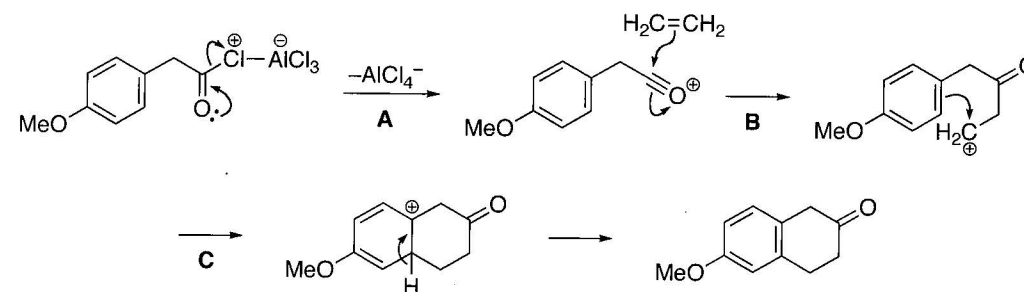
A035



Wynberg, H.; Meijer, E. W. *Org. React.* **1982**, 28, 1.

Reimer-Tiemann reaction. **A**: Deprotonation of CHCl_3 followed by α -elimination to form dichlorocarbene ($\text{p}K_{\text{a}} \text{CHCl}_3 = 13.6$, $\text{H}_2\text{O} = 15.7$). **B**: Formation of phenoxide ion ($\text{p}K_{\text{a}} \text{PhOH} = 10$). **C**: Attack of the phenoxide ion to dichlorocarbene. **D**: Protonation. **E**: Aromatization. **F**: Elimination of chloride ion helped by the oxygen lone pair of the phenoxide ion. **G**: Conjugate addition of hydroxide ion. **H**: Elimination of chloride ion.

A036



or