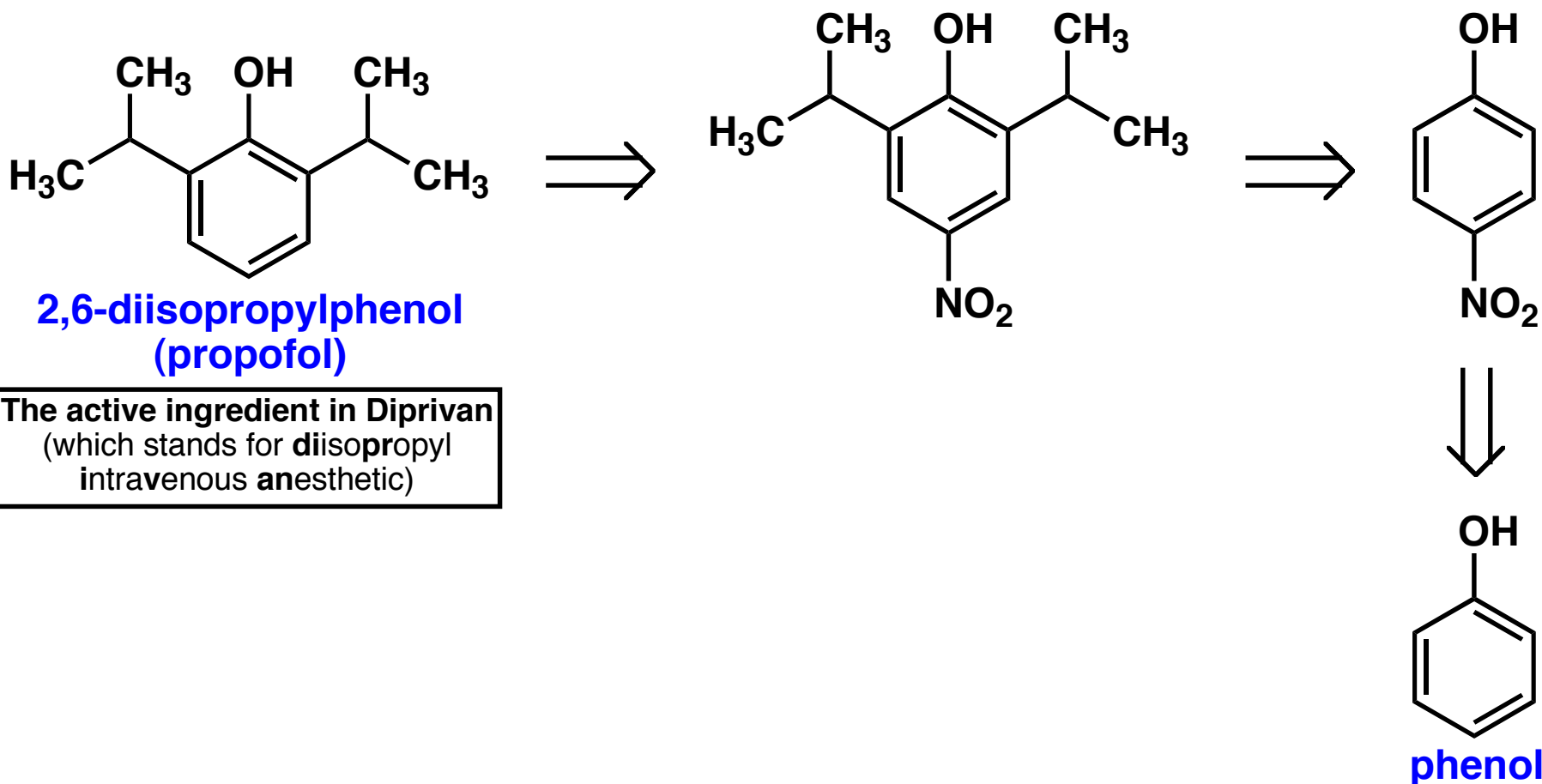


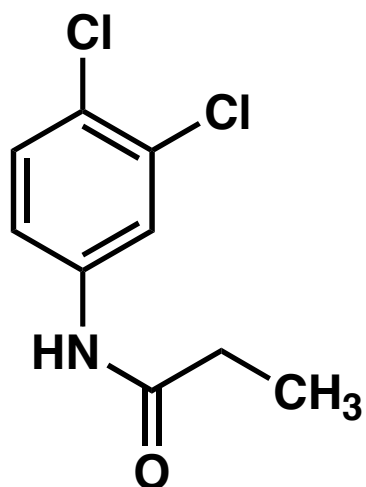
Discussion Problem

Diprivan is the drug that made the news in July of 2009 when it was implicated in the death of Michael Jackson. According to the following retrosynthetic analysis, the active compound in diprivan, propofol, is synthesized from phenol. According to this retrosynthetic plan, what reagents are needed to conduct each step of the synthesis?

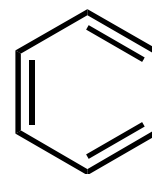
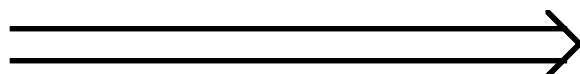


Discussion Problem

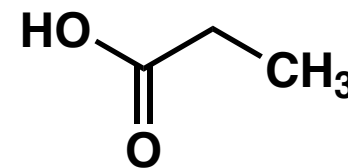
The herbicide propranil can be synthesized from benzene and propanoic acid (these compounds provide all of propranil's carbon atoms). Outline a retrosynthetic strategy for propranil. According to your retrosynthetic plan, what reagents are needed to conduct each step of the synthesis?



propranil



benzene



propanoic acid

Discussion Problem

Agent Orange was the code name for a herbicide developed for the military, primarily for use in tropical climates. The purpose of the product was to deny an enemy cover and concealment in dense terrain by defoliating trees and shrubbery where the enemy could hide. "Agent Orange" (named for the orange band that was used to mark the drums it was stored in) was principally effective against broad-leaf foliage, such as the dense jungle-like terrain found in Southeast Asia. Agent Orange contains (2,4,5-trichlorophenoxy)acetic acid, called 2,4,5-T. This compound is synthesized by the partial reaction of 1,2,4,5-tetrachlorobenzene with sodium hydroxide, followed by reaction with sodium chloroacetate, $\text{ClCH}_2\text{CO}_2\text{Na}$.

- (a) Write equations for the two reactions mentioned.
- (b) One of the impurities in the Agent Orange used in Vietnam was 2,3,7,8-tetrachlorodibenzodioxin (TCDD). Provide a mechanism to show how TCDD is formed.

