



2. Dioctyl phthalate (DOP) is a common plasticizer for plastics like PVC. Its role is to increase the flexibility and durability of the plastic materials, making them suitable for products such as hoses, electrical wire coatings, or leather imitations. It can be easily synthesized from phthalic anhydride (anhydride of benzene-1,2-dicarboxylic acid) and the corresponding octanol in acidic conditions.
- Show the mechanism of the reaction between phthalic anhydride and octanol in acidic conditions (you don't have to show the full structure of the octanol; you may represent it as R-OH). What is the name of this mechanistic pathway?
  - Which step is faster, the substitution with the first or with the second alcohol molecule? Explain your answer.
  - What is the role of the acid in this system?

3. Propose synthetic sequences for obtaining the following compounds from benzene: a) *m*-methylnitrobenzene and b) *p*-methylnitrobenzene. Give the names of all the reactions that you use in your proposed sequences.

**Reading Suggestions:**

Clayden, Greeves, Warren, *Oxford University Press*, **2012**.

Organic Chemistry, John McMurry, *Thomson Brooks/Cole*, **2008**.

Chimie Organique, Les Grands Principes, John McMurry, *Dunod Editeur*, **2009**.

Chimie Organique, Paul Arnaud, *Dunod Editeur*, **2009**.