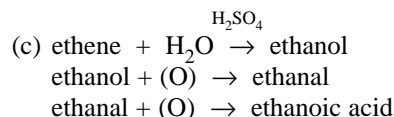


ACTIVITY 1.9.1 BUILDING MOLECULAR MODELS TO ILLUSTRATE REACTIONS

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- (b) (Answers will vary, depending on the structures created. Reaction #10 would be aromatic; others may be any of the three types, but most likely aliphatic.)

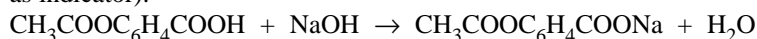


ACTIVITY 1.9.2 PREPARATION OF AN ESTER—ASPIRIN

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- (a) (Answer will depend on actual measurements.)
Calculate theoretical yield of ASA using mass of reactants used.
$$2 \text{HOC}_6\text{H}_4\text{COOH} + (\text{CH}_3\text{CO})_2\text{O} \rightarrow 2 \text{CH}_3\text{COOC}_6\text{H}_4\text{COOH} + \text{H}_2\text{O}$$

salicylic acid + acetic anhydride \rightarrow acetylsalicylic acid + water
actual yield = mass of ASA obtained
percentage yield = (actual yield/theoretical yield) \times 100%
- (b) The carboxyl group in ASA imparts acidic properties to the compound; one of the properties of an acid is a sour taste.
- (c) The purity of the ASA can be tested by titrating a sample of the ASA with a base (e.g., NaOH, using phenolphthalein as indicator).



Procedure

1. Dissolve a known mass of ASA in methanol in an Erlenmeyer flask.
2. Add a few drops of phenolphthalein.
3. Titrate with a standard solution of NaOH_(aq) delivered from a buret, until the solution just turns pink.
4. Repeat steps 1 to 3 three more times.

Calculations

$$n_{\text{NaOH}} = cV$$

$$n_{\text{ASA}} = n_{\text{NaOH}}$$

$$m_{\text{ASA}} = nM$$

$$\text{purity of ASA} = (m_{\text{ASA}}/\text{mass of sample}) \times 100\%$$

Safety Precautions:

Sodium hydroxide is corrosive. Wear a lab apron and eye protection. If the base comes into contact with skin, wash well with cool water.

Methanol is flammable; keep away from open flames.

CHAPTER 1 SUMMARY

MAKE A SUMMARY

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(Answers will vary.)

CHAPTER 1 SELF-QUIZ

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1. False: An ester is formed when the hydrogen atom from the hydroxyl group of an alcohol and the hydroxyl group of the carboxyl group of an acid are eliminated, and water is condensed.
2. True