Alcohols and their reactions

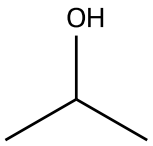
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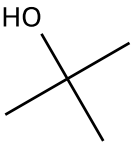
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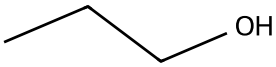
Name _____ Date _____

1. Classify three structures

Classify structures A, B and C as primary, secondary or tertiary alcohols. Explain your rule.

A 

B 

C 

2. Explain the boiling point

Propan-1-ol boils at 97 °C. Butane has a similar molar mass but boils at about −1 °C. Explain the large difference.

3. Collect the distillate

A student adds acidified potassium dichromate(VI) to butan-1-ol and distils the organic product as it forms. Identify the intended product, write an equation using [O] and explain the choice of distillation.

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4. Predict the reflux product

A second student heats 2-methylpropan-1-ol under reflux with excess acidified potassium dichromate(VI). Identify the organic product. Write the equation using [O] and explain how the conditions favour that product.

5. Compare two test results

Butan-2-ol and 2-methylpropan-2-ol are warmed separately with acidified potassium dichromate(VI). Give the usual colour change or lack of change and name any organic product.

6. Predict two structures

Butan-2-ol is heated in the presence of concentrated phosphoric acid. Write condensed formulae for the two structural alkene products and name the reaction type.

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7. Build a two-stage route

Suggest a two-stage route from ethene to ethanal. Identify the intermediate, the reagent or reagents for each step, and how you collect the ethanal.

8. Assess a biofuel claim

Write the equation for fermentation of glucose to ethanol. Explain why making ethanol from a crop does not guarantee zero net carbon dioxide emissions.

9. Extra challenge · Use oxidation evidence to recover structures

Three isomeric alcohols A, B and C have the 2-methylbutane carbon skeleton. Warm each with excess acidified potassium dichromate(VI). A stays orange. B gives a ketone. C gives a carboxylic acid with a methyl branch next to COOH.

Give condensed structural formulae for A, B and C. Name the type of alcohol in each case and write an equation for C using [O].

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