

A Level Christmas Chemistry



The three gifts

1) Gold

Gold has a melting point of 1337K and a boiling point of 3243K. The atomic number of gold is 79.

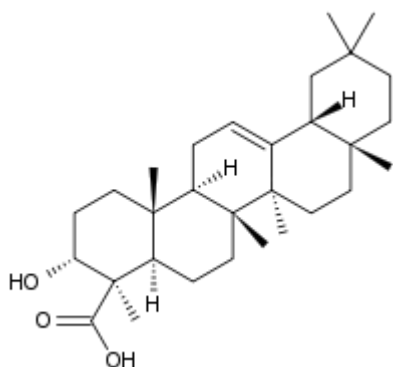
- a. With reference to bonding, explain why it has a high melting and boiling point.

- b. Using subshell notation, write out the full electron configuration of gold.

- c. Gold is found in compounds as ions with oxidation state +1 and +3. What is the electron configuration of these gold ions?

2) Frankincense

Frankincense is a mixture of many compounds, including Boswellic acid. The structure of α -Boswellic acid is shown below.



https://en.wikipedia.org/wiki/Boswellic_acid

a. Which intermolecular forces are present in α -Boswellic acid?

b. Would you expect α -Boswellic acid to be soluble in water? Explain your answer.

c. Draw the structure of the main organic product that you would expect to see if α -Boswellic acid is subjected to the following conditions.

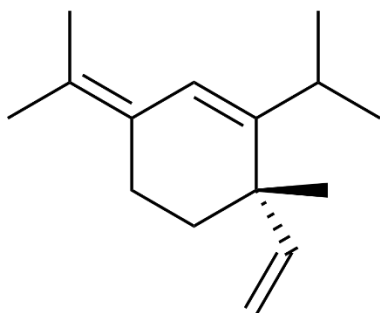
i. Heat under reflux with potassium dichromate(VII) dissolved in dilute sulfuric acid.

ii. Heat with methanol and concentrated sulfuric acid in the absence of water.

iii. Addition of bromine at room temperature.

3) Myrrh

Myrrh resin is rich in organic compounds. These include the group of naturally occurring organic compounds called the elemenes. The compound below is α -elemene.



<https://upload.wikimedia.org/wikipedia/commons/thumb/2/22/Alpha-elemene.svg/945px-Alpha-elemene.svg.png>

- a) Would you expect α -elemene to be optically active? Explain your answer.

- b) Draw three non-aromatic positional isomers of α -elemene.



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