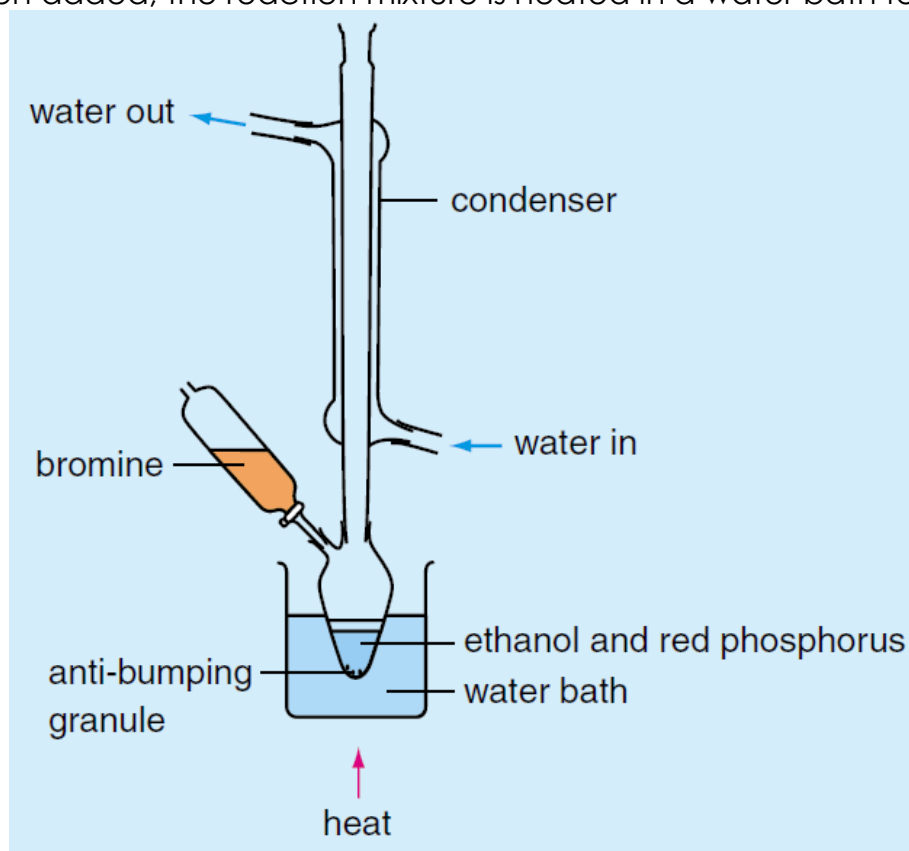


### Quiz (Testing Purity)

1. A student is given an unknown solid  $X$ . He finds that the solid melts sharply at  $133^{\circ}\text{C}$ . He looks up a chemistry data book and finds that urea has a melting point of  $133^{\circ}\text{C}$ .
  - (a) Do you think solid  $X$  is urea? Explain your answer.
  - (b) Describe how to test whether solid  $X$  is urea by using a chromatographic method.
2. To prepare bromoethane (b.p.:  $38.5^{\circ}\text{C}$ ), bromine (b.p.:  $59^{\circ}\text{C}$ ) is added dropwise to a mixture of ethanol (b.p.:  $78^{\circ}\text{C}$ ) and red phosphorus. After all the bromine has been added, the reaction mixture is heated in a water bath for 30 minutes.



- (a) What is the use of the condenser in the set-up?
- (b) Suggest how to separate bromoethane from the reaction mixture.
- (c) How can you check whether the bromoethane obtained from the experiment is pure?

**Suggested Answer**

1. (a) The identity of a compound cannot be confirmed by melting point alone because different compounds may have the same melting point.
  - (b) Spot the sample solution of solid X on the baseline of a chromatographic plate.  
The spot the sample solution of urea next to the spot of solid X.  
Put the plate vertically in a suitable developing solvent.  
After that, put the plate in a jar saturated with iodine vapour.  
Compare the distance travelled by the two spots. If the two spots travel with the same distance, solid X is likely to be urea.
2. (a) To prevent the loss of volatile substances on prolonged heating.
  - (b) Distil the reaction mixture. Collect the distillate with a boiling point range from 36.5 °C to 40.5 °C.
  - (c) By determining the boiling point of the crude product (bromoethane).  
Check whether it agrees with that given in the data book.