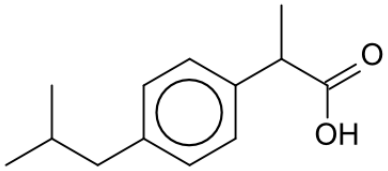
Chemistry Investigation NAME_____

Solubility of Ibuprofen

Ibuprofen is a nonsteroidal anti-inflammatory drug (NSAID) commonly used to relieve symptoms of pain or swelling. Its systematic name is methylpropyl-phenyl propanoic acid, and its structure is shown below.



Ibuprofen

Equipment:

- Test tube
- Distilled water
- Ibuprofen capsule
- Sandpaper
- Mortar and pestle
- Spatula
- Sodium carbonate solution
- Hydrochloric acid solution

Procedure:

1. Hold the sandpaper on the desk (rough side up) and rub the ibuprofen capsule on it to remove the capsule's coating. The coating can be disposed of.
2. Using the mortar and pestle, crush the capsule into a fine white powder.
3. Use a spatula to place a small amount of the powder into a test tube.
4. Half-fill the test tube with distilled water and stir to dissolve some of the powder. If the powder is not dissolving well, try adding some sodium carbonate solution and/or warming the test tube.
5. Allow the contents of the test tube to settle, and then add a drop of hydrochloric acid, recording any observations.

Questions:

A. Circle and name all functional groups on the structural formula diagram above.

B. Another name for a benzene group is *phenyl*. Draw arrows to connect each word in ibuprofen's systematic name to the section of the molecule it refers to.

C. Redraw the structural formula of ibuprofen, expanding the skeletal form carbon chains (don't expand the benzene group any further).

D. Using a diagram, explain how the sodium carbonate helps ibuprofen dissolve in water.

E. Explain the chemistry behind any observations made in step 5 of the procedure.