

Introduction (provided by AV)

Chemical and physical properties of a compound, such as solubility and melting point, can be used to identify a compound and estimate its degree of purity. Solubility of a compound is the extent to which the compound dissolves in a liquid.¹ The amount of a solvent that is needed to recrystallize an unknown provides information about its solubility, which provides clues about its identity. The melting point is the temperature at which a solid is converted to its liquid phase.¹ The mixture melting-point process is used for identification of the unknown and determination of its purity. In this process, an unknown's identity is determined by mixing the unknown with an authentic sample of each known compound and measuring the melting point of the mixtures.² The process works based on the fact that a melting point of a compound is lowered and its range broadened when combined with another compound. If the compound melts over a narrow range close to its literature value, it is considered to be quite pure. However, if it melts over a broader range far from its literature value it is considered impure. For this experiment, the solubility and melting point properties for the unknown component of Panacetin were observed and used to identify it as acetanilide or phenacetin.

References

1. Smith, J. G. Introduction to Organic Molecules and Functional Groups. *Organic Chemistry*, 2nd Edition; McGraw-Hill: New York, 2008; pp 82-113.
2. Lehman, J. W. *Multiscale Operational Organic Chemistry: A Problem-solving Approach to the Laboratory Course*; Prentice Hall, Inc.: New Jersey, 2002; pp. 35-39.

(where purple is background information and orange is the goal of the experiment)

The listed references are those cited in the introduction.