

Lab 3: Recrystallization Process

Introduction

A pure substance is made of homogenous molecules with the same fundamental structure. However, compounds perceived to be pure based on certain chemical characteristics may actually have small amounts of contaminants. Certainly, the presence of impurities will lead to errors in the identification of the compound. Recrystallization is the technique that facilitates the purification of chemical substances and their subsequent identification through their physical characteristics such as melting point. The method involves the dissolution of solid substance in a suitable solvent at an elevated temperature and the subsequent reformation of the crystals upon cooling, leaving the contaminants in solution. The intermolecular forces (usually Van Der Waals forces) between the solute molecules are overcome during the recrystallization process leading to the formation of pure crystals of the solid. Recrystallization takes advantage of the fact that most solids are more soluble in hot than a cold solvent. Therefore, if a solid is dissolved in a hot solvent in an amount that would be excess when the solvent is cool, crystals will form when the solution is allowed to cool.

Results

The recrystallization of the unknown solid 7/A was performed using water as the solvent. 1.009g of solid 7/A was recovered via the vacuum filtration, reflecting a 95% recovery from the sample of solid 7/A used. The melting point of the recrystallized solid 7/A product was in the range of 49°C -52°C while the melting point range of the original sample was between 45°C – 55°C. The original sample, therefore, had impurities that reduced its melting point while also widening the range. It is thus evident that recrystallization of the solid sample helped to narrow the melting point range and this facilitates the identification of the unknown solid.

Reference

JoVE Science Education Database. *Organic Chemistry*. Purifying Compounds by Recrystallization. JoVE, Cambridge, MA, (2019).