Rate of Dissolving

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Learning Objectives

• Identify factors that affect the rate of dissolving.

If you’re like Tanya in this picture, you prefer your iced tea sweetened with sugar. Sweetened iced tea is a solution in which solid sugar (the solute) is dissolved in cold liquid tea, which is mostly water (the solvent). When you add sugar to tea, particles of water pull apart particles of sugar. The particles of sugar spread throughout the tea, making all of it taste sweet.

Factors That Affect the Rate of Dissolving

Did you ever get impatient and start drinking a sweetened drink before all the sugar has dissolved? As you drink the last few drops, you notice that some of the sugar is sitting on the bottom of the container.

Q: What could you do to dissolve the sugar faster?

A: The rate of dissolving is influenced by several factors, including stirring, temperature of solvent, and size of solute particles.
Stirring

Stirring a solute into a solvent speeds up the rate of dissolving because it helps distribute the solute particles throughout the solvent. For example, when you add sugar to iced tea and then stir the tea, the sugar will dissolve faster. If you don’t stir the iced tea, the sugar may eventually dissolve, but it will take much longer.

Temperature

The temperature of the solvent is another factor that affects how fast a solute dissolves. Generally, a solute dissolves faster in a warmer solvent than it does in a cooler solvent because particles have more energy of movement. For example, if you add the same amount of sugar to a cup of hot tea and a cup of iced tea, the sugar will dissolve faster in the hot tea.

Particle Size

A third factor that affects the rate of dissolving is the size of solute particles. For a given amount of solute, smaller particles have greater surface area. With greater surface area, there can be more contact between particles of solute and solvent. For example, if you put granulated sugar in a glass of iced tea, it will dissolve more quickly than the same amount of sugar in a cube (see Figure 1.1). That’s because all those tiny particles of granulated sugar have greater total surface area than a single sugar cube.

Summary

- The rate of dissolving of a solute in a solvent is faster when the solute and solvent are stirred, the solvent is warmer, or the solute consists of smaller particles with more surface area.

Review

1. List three factors that affect the rate at which a solute dissolves in a solvent.
2. Gina is trying to dissolve bath salts in her bathwater. How could she speed up the rate of dissolving?
Resources


References