

Classroom Chemistry – Alka-Seltzer and Pressure

Will the rate of a chemical reaction that involves gases be decreased by increasing the pressure on the reactants?

Materials:

- 2 glass baby food jars with tight fitting lids.
- 2 Alka-Seltzer tablets
- Safety glasses
- Graph paper
- Stop watch
- Measuring cup



Procedure: (Remember to have your parent's permission and have them watch and help you.)

- Put on the safety glasses.
- Fill the baby food jar with 100 ml of room temperature water (half full).
- Drop the Alka-Seltzer tablet into the jar.
- Measure the time it takes for the reaction between the Alka-Seltzer and the water to be completed. Record the time it takes to dissolve.
- Fill the other baby food jar with 100 ml of room temperature water.
- Drop the Alka-Seltzer tablet into the jar and screw the lid on. Record the time it takes to dissolve.
- If the Alka-Seltzer tablet does not completely dissolve but bubbles stop being produced consider the reaction ended and record the time. Do not worry if bubbles of gas can be seen or heard escaping from the sealed jar.

What's happening?

If any of the products or reactants involved in a chemical reaction are gases, the rate of reaction will decrease as pressure on the system is increased. When water reacts with Alka-Seltzer, one of the products of the reaction is carbon dioxide gas. Pressure inside the jar is controlled by slowing down the rate at which the gas is allowed to escape. The sealed lid allows the carbon dioxide gas to build up in the jar with the effect that the increase in pressure reduces the rate of reaction.

Note: Do not try to stop all of the gas from escaping! If you try to do so, the lid could fly off unexpectedly or the jar could theoretically break (glass baby food jars are designed to be tough). You just need to slow down the escaping gas allowing pressure to build up inside of the jar. That pressure acts upon the surface of the liquid. The gas moves in a direction that will relieve the pressure, that is upward and out. Avoid a total "blow-out" by releasing enough pressure by slightly opening the lid from time to time (like you'd do with a fizzy bottle of pop).

Extension:

You may repeat the sealed jar portion but this time take the lid off when the tablet is half dissolved and observe the effect this has on the reaction. Seal it up again and again observe the effect on the reaction.

This activity is based on our "Classroom Chemistry" kit that is currently under development. The source for this lab is: http://www.alka-seltzer.com/as/student_experiment.html. Our teaching kits (described on our website) are loaned out FREE to provide classroom teachers and parents of home schooled children an opportunity to explore Science in interesting ways. Please consider volunteering as a classroom speaker or allow your business as a field trip location.

Lorne Cooper, Regional Executive Director

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