

Conductivity

Purpose

To demonstrate the conductivity of a variety of substances in solution. To classify substances as weak, strong or nonelectrolytes.

Materials

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| Conductivity apparatus | NaCl |
| Small beakers | Glacial acetic acid |
| Distilled water/wash bottle | 1 M HC ₂ H ₃ O ₂ |
| Sugar | 1 M HCl |

Procedure

1. Place distilled water in a beaker. Ask for prediction of conductivity. Test with apparatus.
2. Place tap water in a beaker. Test for conductivity.
3. Add sugar to distilled water. Test for conductivity.
4. Begin with new beaker of distilled water. Add NaCl. Test.
5. Test beaker of the acids in this order
 - a) HCl
 - b) 1 M HC₂H₃O₂
 - c) Glacial acetic acid
6. Dilute glacial acetic acid by half (double the volume). Test conductivity.
7. Repeat step 6. Test conductivity.

Additional Information

1. Be sure to clean electrodes well in distilled water between tests.
2. Be careful with electrodes – shock hazard!!!

Questions for the Students

1. Why doesn't distilled water conduct electricity?

2. Why does tap water conduct?
3. What must be present for conductivity to occur?
4. Why is 1 M HCl such a strong electrolyte? Draw a molecular picture.
5. Why is 1 M HC₂H₃O₂ a weak electrolyte? Draw a molecular picture. How is it different from HCl?
6. Why is glacial acetic acid a nonelectrolyte?
7. Why does it begin to conduct when we add distilled water?

Disposal

Solutions can be poured down the drain with excess water.

Reference

University of Illinois, Urbana-Champaign.