

Disappearing Ink

Purpose

To illustrate the effect of pH change on indicator color.

Materials

- Thymolphthalein
- Ethanol
- Sodium hydroxide solution, NaOH (0.1 M)
- 100-mL beaker or bottle

Safety

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| <ul style="list-style-type: none">• Read the SDS sheets for all chemicals before using them.• Wear safety glasses and gloves.• Sodium hydroxide is caustic; handle with care. |
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Procedure

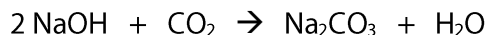
1. Dissolve a small amount of thymolphthalein in ~10 mL of ethanol.
2. Slowly add 40 mL of water while stirring.
3. Add aqueous sodium hydroxide solution, 0.1 M, dropwise, until solution turns dark blue.
4. The resulting solution can be used as disappearing ink.

Results

- The ink disappears over time.

Follow-up Teaching Notes

- Thymolphthalein is blue above pH 10 and colorless below pH 9.
- The ink solution becomes colorless as it absorbs carbon dioxide from the air



Connections

- acid/base indicators, pH.

Extension

- Two common invisible inks are:
 AgNO_3 (aq), which can be developed by light
 CuSO_4 (aq), which can be developed by ammonia

Disposal/Clean-up

- The paper can be disposed of in the garbage.
- Extra ink can be placed in a sealed and properly labeled container for reuse.