

## A NEW CLOCK REACTION PREPARATION OF DICINNAMALACETONE

*A Chem Ed* TESTED DEMONSTRATION

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### PREPARATION

Dissolve 4.0 ml of cinnamaldehyde in 25 ml of 95% ethanol, add 15 ml of 2 M KOH, and swirl to form a homogeneous solution. Provide acetone, a 1-ml pipet, and a timing device.

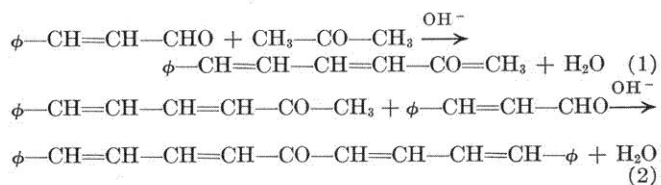
### DEMONSTRATION

While stirring, add 1 ml of acetone to the solution of cinnamaldehyde in alcoholic potassium hydroxide. Start timing. Within 30–45 sec after addition of the acetone, depending on the temperature, a cloud of dicinnamalacetone crystals will appear throughout the entire solution. If the reaction vessel is allowed to stand 10–20 min, crystals of pure cinnamalacetone can be separated in 90–100% yield. Melting point, 140°C, after crystallization from alcohol.

### REMARKS

Reproducible results, within 1 or 2 sec, are obtained if the reagents are measured with care. It is convenient to add the acetone with a 1-ml blowout pipet.

An equally satisfactory clock effect will be obtained if benzaldehyde is substituted for cinnamaldehyde, but the appearance time for dibenzalacetone will be somewhat longer, approximately 90 sec. The reaction proceeds in two steps: relatively slow formation of cinnamalacetone followed by rapid reaction of cinnamalacetone with a second molecule of cinnamaldehyde.



The product responsible for the clock effect is dicinnamalacetone. This product may be isolated even if acetone is used in excess. For best results the reaction vessel should be agitated with a magnetic stirrer. However, the clock effect will be observed even if stirring is stopped after addition of the acetone.

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## THERMAL EXPANSION OF GASES

*A Chem Ed* TESTED DEMONSTRATION

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### PREPARATION

Provide a small (approximately 2.5-in. diameter uninflated) rubber balloon, a 250-ml beaker, liquid nitrogen (or air) in an appropriate container.

### DEMONSTRATION

Fill the balloon with air to a 2.5-in. diameter (approximate). Place the balloon on the beaker (as a holder for the balloon and a collector for liquid nitrogen), pour a small quantity of liquid nitrogen over the balloon. It will contract until it is the same size as when deflated. Display the balloon (caution—it is very brittle) and observe as it returns to room temperature that it reinflates to the original diameter.

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