INTRODUCTION TO
Organic Laboratory Techniques
A CONTEMPORARY APPROACH

Third edition

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To All of Our Students in Chemistry 354 and 355

An oil bath with ordinary mineral oil cannot be used above 200 to 220 °C. Above this temperature the oil bath may "flash," or suddenly burst into flame. A hot oil fire is not extinguished easily. If the oil starts smoking, it may be near its flash temperature; discontinue heating. Old oil, which is dark, is more likely to flash than new oil is. Also, hot oil causes bad burns. Water should be kept away from a hot oil bath, since water in the oil will cause it to splatter. Never use an oil bath when it is obvious that there is water in the oil. If there should be water present, replace the oil before using the heating bath. An oil bath has only a finite lifetime. New oil is clear and colorless but, after extended use, becomes dark brown and gummy from oxidation.

Besides ordinary mineral oil, a variety of other types of oils can be used in an oil bath. Silicone oil does not begin to decompose at as low a temperature as mineral oil does. When silicone oil is heated high enough to decompose, however, its vapors are far more hazardous than mineral oil vapors. The polyethylene glycols may be used in oil baths. They are water-soluble, which makes cleaning up after using an oil bath much easier than with mineral oil. One may select any one of a variety of polymer sizes of polyethylene glycol, depending on the temperature range required. The polymers of large molecular weight are often solid at room temperature. Wax may also be used for higher temperatures, but this material also becomes solid at room temperature. Some workers prefer to use a material that solidifies when not in use since it minimizes both storage and spillage problems. Vegetable shortening is occasionally used in heating baths.

1.5 HEATING MANTLES

A useful source of heat for situations that require temperatures above 100 °C is the heating mantle, illustrated in Figure 1–3. The heating mantle consists of a blanket of spun fiberglass with electric heating coils embedded within the blanket. This blanket fits snugly around the flask, providing an even source of heat. The temperature of a heating mantle is controlled by a Variac. Some heating mantles are designed to fit only

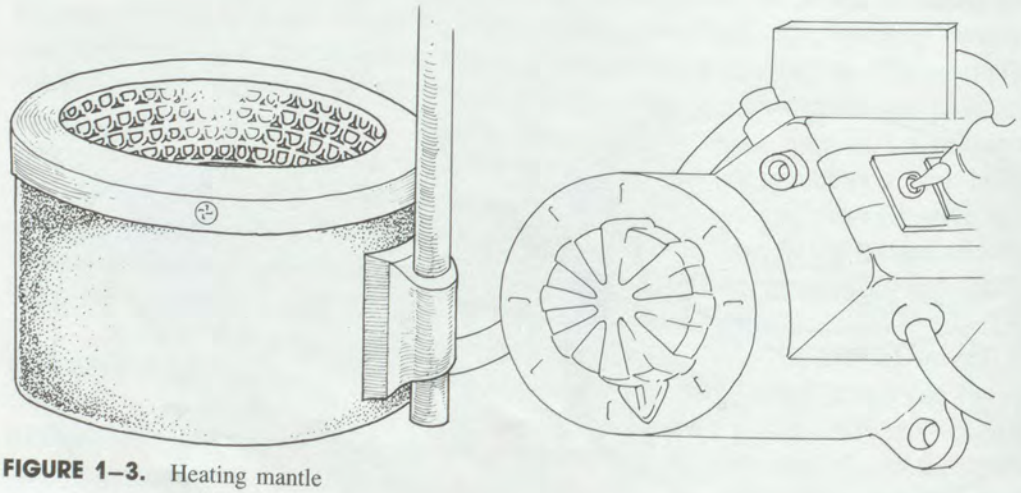

FIGURE 1–3. Heating mantle

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