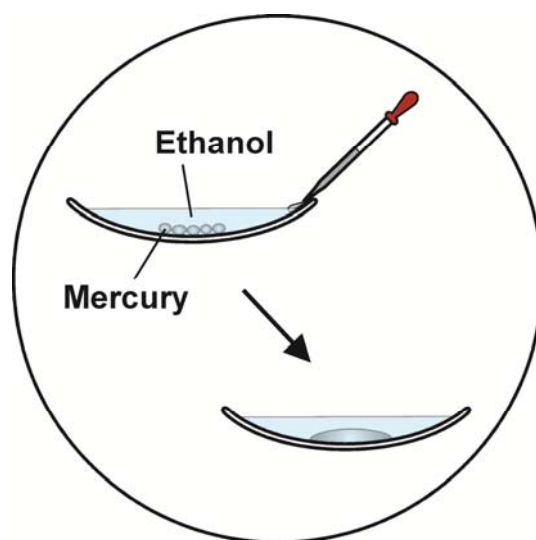


# Merging of Droplets of Mercury



## Equipment:

Overhead projector

Watch glass (e.g. with a diameter of 60 mm)

Dropper (tip with an inner diameter from 0.2 to 0.4 mm)

## Chemicals:

Mercury

Ethanol

## Safety:

Mercury (Hg) :



H330-360D-372-410

P201-273-304 + 340-308 + 310 P305 + P351 + P338

Mercury is very poisonous! Inhalation of vapors can cause danger to life.

Ethanol ( $C_2H_5OH$ ):



H225-319

P210-240-305 + 351 + 338-403 + 233

Liquid and vapor are highly flammable. Ethanol also causes severe eye irritation.

It is necessary to wear a lab coat, safety goggles and protective gloves, because every contact with the substances, especially mercury, should be avoided. The experimental work has to be done in a fume hood with adequate ventilation.

## Procedure:

The watch glass is half filled with ethanol and placed on the overhead projector. With the help of the dropper, about 0.3 mL of mercury is then dripped into the watch glass from the edge in such a way that small droplets are formed. The image of the droplets lying in the watch glass should be sharply focused.

## Observation:

After a few minutes, all droplets have gradually merged to form one large drop. For this purpose, always two drops coalesce here and there and bring the remaining drops into violent motion.

## Explanation:

Due to surface tension and the associated higher energy of the surface atoms, liquid drops tend to minimize their surface area; this applies in particular to mercury with its high surface tension of  $485.5 \text{ mN m}^{-1}$ . If there are no external forces at work, the drops will assume a spherical shape because a sphere has the smallest surface area for a given

volume. Large drops grow at the cost of smaller ones because this also leads to a minimizing of the total surface area (the surface area of a large sphere is smaller than the sum of the surface areas of many small spheres). However, in the presence of gravity larger drops tend to get elongated vertically (mercury has a high density of about  $13500 \text{ kg m}^{-3}$ ).

**Disposal:**

The liquid containing mercury has to be disposed of as especially hazardous heavy metal waste.