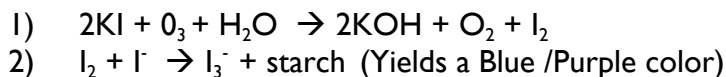


Monitoring Tropospheric Ozone

Identify how tropospheric ozone concentration is affected by a variable of your choice.

Background Information

One method of monitoring ozone is preparing test strips that are chemically sensitive to ozone. Christian Friedrich Schoenbein (1799-1868), a professor at the University of Basel, Switzerland first used these test papers 100 years ago. To prepare the ozone sensitive paper, filter paper will be coated with a gelled paste made of starch and water, containing a small amount of potassium iodide. The following reaction explains the visible color change.



Preparing Ozone Test Strips (aka Schoenbein Papers)

1. Place 100 ml of water in a 250ml beaker then add 5g of corn starch.
2. Heat and stir mixture until it gels. The mixture is gelled when it thickens and becomes somewhat translucent.
3. Remove the beaker from the heat and add 1g of potassium iodide and stir well. Cool the solution.
4. Cut the filter paper into narrow 1 inch wide strips.
5. Dip a strip of filter paper into the beaker and remove excess gel. Apply the gel as uniformly as possible.
6. Allow the paper to dry. Do not set in direct sunlight. A low-temperature drying oven works best. The paper can be dried in a microwave for 30 to 60 seconds. Use shorter intervals to insure the paper does not burn
7. Place the finished strips in a zip-lock plastic bag of direct sunlight.
*Wash hands thoroughly with soap and scrub under fingernails with a brush after working with the potassium iodide mixture.

Paper Use

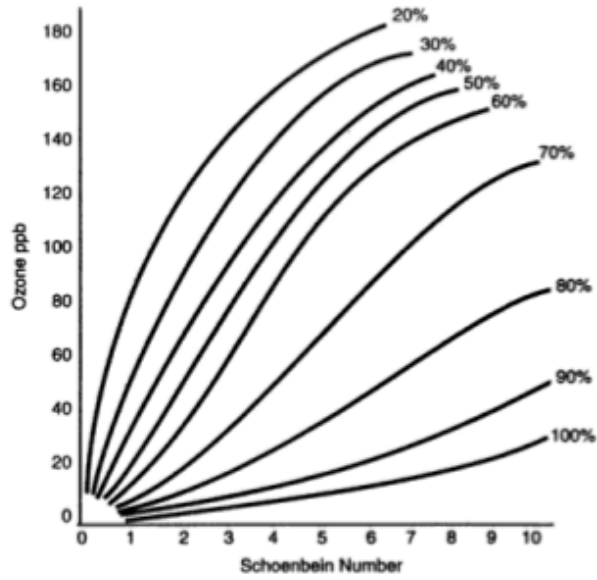
1. Dip a strip of test paper in distilled water and hang it at a data collection site out of direct sunlight. Make sure the strip can hang freely.
2. Expose the paper for approximately eight hours. Seal it in an airtight container if the results will not be recorded immediately.
3. To observe and record test results, dip the paper in distilled water. Observe the color and determine the Schoenbein Number using the Schoenbein color scale.
4. Determine the relative humidity of the data collection site by using a bulb psychrometer or local weather data. Round off the relative humidity reading to the nearest 10 percent. (High relative humidity makes the paper more sensitive to ozone, and a higher Schoenbein Number is observed. To correct for this, the relative humidity must be determined and figured into the calculation of ozone concentration.) Refer to the Relative Humidity Number Chart. Along the bottom of the chart, find the point that corresponds to the Schoenbein number that you recorded. From that point, draw a line upward until it intersects with the curve that corresponds to your humidity reading. To find the ozone concentration in parts per billion, draw a perpendicular line from the Schoenbein number/relative humidity point of intersection to the left side of the chart.

Schoenbein Color Scale



Schoenbein Number	
0-3	Little or no change
4-6	Lavender Hue
7-10	Blue or Purple

Relative Number Chart



Humidity/Schoenbein