The Construction of a Nephelometer and Its Use for the Determination of Chloride in Water Samples

Garnett, Clayton (School: Moberly High School)

The objective of this experiment was construct a Turbidimeter and Nephelometer for the purpose of quantitatively determining the chloride content of a sample of water. The chloride will form a colloidal suspension and scatter light by the reaction of Silver Nitrate ($AgNO_3$) with Chloride ions (Cl^-). The Nephelometer will detect the amount of light scattered at right angles while the Turbidimeter will measure the amount of light passing through or unscattered. The solutions were varied throughout the experimental period in order to find the most applicable and reproducible results. The most effective solution hypothesized consisted of 5 mL of several different ppm Cl^- standards ranging from 10 ppm - 60 ppm combined with 3 mL of water and 2 mL of .005 M $AgNO_3$. With the Vernier light sensor probe used with the LoggerPro software light is measured on a scale ranging from 0 - 1 with 0 being a complete absence of light and 1 being bright light directly hitting the probe. Initial tests results showed a gradual decrease of the amount of light passing through with a slight increase in light scattered by the colloidal AgCl through a range of solutions containing 5 mL of the 10 ppm to 60 ppm Chloride.