$Zn(NO_3)_2 \cdot 6H_2O$ F.W. 297.47

Certificate of Actual Lot Analysis

Acidity (as HNO_3)	0.008%
Alkalies and Earths	0.02%
Chloride (Cl)	0.005%
Insoluble Matter	0.001%
Iron (Fe)	0.0002%
Lead (Pb)	0.001%
Phosphate (PO_4)	0.0002%
Sulfate (SO_4)	0.002%

Store separately from and avoid contact with combustible materials. Keep container closed and in a cool, dry place. Avoid contact with skin, eyes and clothing.

LOT NO. 917356

FL-02-0588 CAS 10196-18-6

FIGURE 1-11 The labeling on a reagent bottle lists the grade of the reagent and the percentages of impurities for that grade. What grade is this chemical?

TABLE 1-1 *Some Grades of Chemical Purity*

Increasing purity ↑

Primary standard reagents
ACS (American Chemical Society–specified reagents)
USP (United States Pharmacopoeia standards)
CP (chemically pure; purer than technical grade)
NF (National Formulary specifications)
FCC (Food Chemical Code specifications)
Technical (industrial chemicals)

Laboratory Chemicals and Purity

The chemicals in laboratories are generally treated as if they are pure. However, all chemicals have some impurities. Chemical grades of purity are listed in Table 1-1. The purity ranking of the grades can vary when agencies differ in their standards. For some chemicals, the USP grade may specify higher purity than the CP grade. For other chemicals, the opposite may be true. However, the primary standard reagent grade is always purer than the technical grade for the same chemical. Chemists need to be aware of the kinds of impurities in a reagent because these impurities could affect the results of a reaction. For example, the chemical label shown in Figure 1-11 shows the impurities for that grade. The chemical manufacturer must ensure that the standards set for that reagent by the American Chemical Society are met.

SECTION REVIEW

1. a. What is the main difference between physical properties and chemical properties?
   b. Give an example of each.
2. Classify each of the following as either a physical change or a chemical change.
   a. tearing a sheet of paper
   b. melting a piece of wax
   c. burning a log
3. You are given a sample of matter to examine. How do you decide whether the sample is a solid, liquid, or gas?
4. Contrast mixtures with pure substances.