

§3.1.3 Standard solution and primary standard

I. Standard solution and primary standard

All kinds of titrimetric analysis need to employ standard solution, that is, a solution of exactly known concentration, there are two ways to confirm the concentration of standard solution: direct and indirect method. During employing the indirect method, primary standard need to be used.? What can be regarded as primary standard?

Requirements that primary standard should meet:

- (1) highly pure, 99.9% pure or better;
- (2) should be of known composition;
- (3) stay stable;
- (4) have a high equivalent weight in order to minimize the relative error caused by weighing.

Primary standard in common use: $K_2Cr_2O_7$; $Na_2C_2O_4$; $H_2C_2O_4 \cdot 2H_2O$; $Na_2B_4O_7 \cdot 10H_2O$; $CaCO_3$; $NaCl$; Na_2CO_3

II. Preparation of standard solution

1. Direct preparation

Weighing with analytical balance, solving in volumetric flask, calculating the concentration of standard solution directly.

e.g. $K_2Cr_2O_7$ can be prepared to be its standard solution? directly.

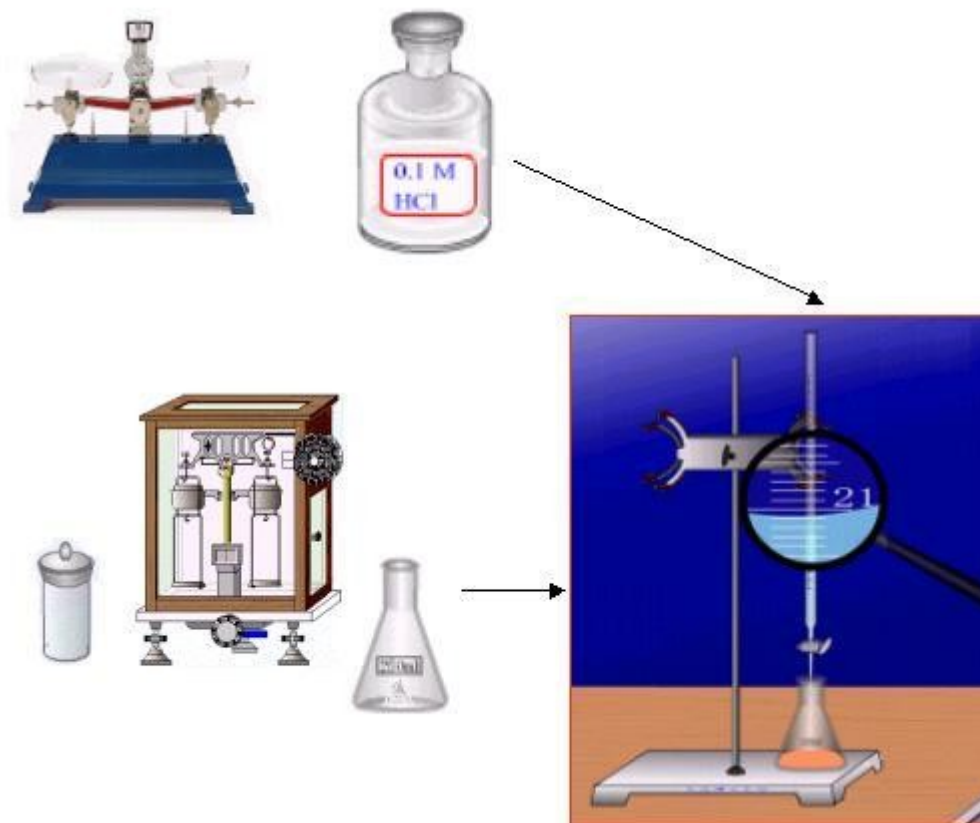
The substances that can be prepared for its standard solution directly should meet the following requirements:

- (1) enough purity, in general, is primary standard or better;
- (2) the composition should be the same with its chemical formula; following affairs should be avoided:
 - (a) crystalline water is lost;
 - (b) the deliquescence of hygroscopic substances.
- (3) Stability——not decompose or oxidized in air and light.



2. Indirect preparation

When it doesn't meet the requirements of direct preparation, standard solution must be prepared according to the following procedures:



(1) Preparation

of the solution: weighing substance, solving it with solvent(water) of certain volume, that is, to prepare a solution with approximately desired concentration;

(2) Standardization: titrating a weighed portion of a primary standard or standard solution with exactly known concentration, confirm the volume of the titrant consumed in the titration. (3) Calculation the concentration of the standard solution by the mass(or volume and concentration) of primary standard.

The key point in this page: The requirements that primary standards should meet, the two ways to prepare standard solution, what kinds of substance can be prepared for standard solution directly. Problems about this page: All the analyte determined by redox titration must be oxidant or reductant, aren't they? Problems about next page: What is the definition of titer, how to express it?