

EDTA Titrations

Dr. Zheng Chang

*Department of Biological and Physical Sciences, South Carolina State University,
Orangeburg, SC*

*Department of Physics, Virginia Polytechnic Institute and State University,
Blacksburg, VA*

1 INTRODUCTION

The EDTA titration is based on the stoichiometric formation of water-soluble metal-EDTA complex to determine the concentration of the metal ion in aqueous solution. “EDTA” is the abbreviation of “ethylenediaminetetraacetic acid” or its anion, “ethylenediaminetetraacetate.” Owing to its chemical structure, EDTA forms stable, water-soluble, 1:1 complexes with most polyvalent metal ions. This distinctive property sets the basis of the EDTA titration, and is also the reason that EDTA titrations are categorized as complexation titrations. In fact, a vast majority of complexation titrations employ EDTA as the complexing agent, and are thus EDTA titrations.

Fundamental studies on EDTA and related compounds can be traced back to 1930s. Schwarzenbach and his coworkers have studied the titrations with EDTA since the mid-1940s. In 1948, they reported that the endpoint of an EDTA titration might be detected by metal-sensitive indicators such as Murexide and Eriochrome Black T. Since then, the application of EDTA in titrations has been widely studied. A number of authors have presented the topic in full-length and well-organized styles [1–4].

Nowadays, with the development of analytical technology, various techniques are available for the analysis of metal ions. In addition to the conventional methods, advanced instrumental techniques such as atomic absorption spectroscopy (AAS),