

Suggested Method for Spectrochemical Analysis of Portland Cement By Fusion with Lithium Tetraborate Using an X-Ray

Introduction

This method is comparable to several fusion methods that have been published from time to time. Note that the various automatic fusion devices are suitable for use with this method with adjustment, if necessary, of quantities of materials. Some methods use lithium metaborate in place of tetraborate.

A similar method was developed in the early 1960s by I. Adler and H. Rose, of the U.S. Geological Survey, Washington, DC. This was a "heavy absorber" method to eliminate any need to make interelement corrections and allow the use of smaller samples. The formula was 100 mg of sample, 100 mg of lanthanum oxide, and 500 mg of lithium tetraborate. This was fused into a bead, ground, and spread carefully over the surface of a 1-in. (25-mm) backing of boric acid, which had been prepared with a flat surface. For X-ray units that take larger samples, quantities would have to be increased. The method was developed for rocks and minerals where only small amounts might be available. The heavy absorber limits analysis to the specimen surface so large amounts of material are not required, but the entire surface must be covered since any void will cause low results. Count rates are lowered by both the heavy absorber and the greater dilution. If freedom from interelement effects is a major consideration and the instrument to be used is sufficiently stable, this approach would have some promise.

Fused flat specimens can also be used without grinding. Care must be taken to assure that the specimens are uniform and without segregations. Required quantities of materials are larger, but the problem of delamination of the specimen from the backing is eliminated. Since the fusion product, whether ground or not, is either stable or only slowly reactive, specimens are essentially permanent and can be reused over long periods of time.

Editor