

DETERMINATION OF SULPHATE ION AND
STRONG ACID CONCENTRATIONS IN PRECIPITATION

1. INTRODUCTION

The present paper gives description of methods to be used for sampling, chemical analysis and testing of methods. The action to be taken by laboratories wanting to participate in the programme, are given in the last chapter.

2. SAMPLING

For sampling a simple funnel combined with a bottle to collect the precipitation, may be used. The main purpose of the equipment is to collect a sufficiently large sample of the precipitation. The amount of precipitation will normally be obtained from a nearby standard precipitation gage. It is however an obvious advantage if the precipitation collector also can give a reasonably correct figure for the amount of precipitation. One condition for this is that the upper part of the funnel is cylindrical.

Calculations indicate that a suitable diameter of the funnel is 30 cm. Diameters between 20 and 40 cm could be used. A suitable size of the sample is 200 ml. The titration of acidity requires 50 ml, the Thorin analysis on sulphate ions requires 25 ml. Using micro equipment and an automated procedure, these volumes may be reduced to 10 and 5 ml (single determination).

Obviously a heavy rainfall will bring down more than 200 ml in a 30 cm funnel, the storage bottle therefore must be larger, 2 liters may be suitable in most cases.

The material in the funnel should be polyethylene or glass. The material in the container should be borosilicate glass. New glass

equipment should be treated with hot (90° C) 10 % hydrochloric acid for 12 hours, then rinsed and soaked in deionized water for another 24 hours.

Equipment for sequential sampling is under development at some laboratories, and descriptions will be circulated when these developments are completed.

3. CHEMICAL ANALYSIS

Analysis on sulphate ion and titration of total strong acids are described in separate papers.

To ensure comparability of results, it is very important that the methods described are meticulously followed. If a laboratory for some reasons comes to the conclusion that the method should be altered, this should be reported to the CPA, while the routine analysis follows the specified method until notice is given from the CPA.

4. CONTROL

In the following are given the procedures to be followed for standardization and comparison of results from the different laboratories.

The CPA will provide 5 standard samples for testing of procedures. The standard samples are kept in polyethylene bottles and will not change composition over a period of 1-2 months.

For two of the standard samples the exact content will be given. For the three others only approximate values are given. The laboratory is asked to perform 3 separate analyses of each sample and send the result back to the CPA.

As a further control, the laboratory is asked to send 20, 100 ml aliquots (if possible) of samples taken during the first weeks to the CPA for control analysis. These samples will be analysed in two laboratories and the results sent back to the laboratory in question. Details for the procedures are given later.