

# Estimation of Dissolved Ion Concentration in Precipitation Based on Electric Conductivity and pH Measurements

Sankichi TAKAHASHI\*, Masanao HIROHASHI\*\*, Susumu TAKAHASHI\*\*\*  
and Katsumi NAKAYA\*\*\*\*

## Abstract

For the survey investigation of acid precipitation rain fall and snow fall, it is necessary to establish a highly accurate and easy estimating method and evaluating method of water-quality applicable commonly for the precipitation at various places in all over Japan, regardless of the difference of rain fall or snow fall.

For this purpose, studies have been made on the estimating method of equivalent concentration of ion from pH-measured value, electric conductivity and setting of common ion-mobility, effect of concentration, ion-type influenced on the electric conductivity of water fall based on the precipitation data of 61 cases of the primary survey on acid precipitation, etc. by the Environmental Agency, thereby, the following items have been clarified.

- (1)  $[H^+]$  influences greatly on the electric conductivity of precipitation, while its influence can be erased by standardization of precipitation pH into pH=5.7
- (2) Common ion moving degree is  $6.2 \times 10^{-4}$  ( $cm^2/V \cdot s$ ).
- (3) Estimating method have been established for the precipitation and water quality applicable for the precipitation in all over Japan of rain fall and snow fall.

**Keywords:** rain and snow, common ionic mobility, total dissolved ion concentration, dissolved concentration of each major ion, estimation

## 1. Preface

Influence of regional nature against water quality of the precipitation has been considered inevitable. It might be due to the insufficient consideration to the  $H^+$  influencing greatly on the conductivity.

Accordingly, for the survey investigation of acid precipitation, it is requested to establish the evaluating and estimating methods of the water quality of precipitation in consideration of the mobility and concentration of main containing ion types such as  $H^+$  etc.

In this report, effective results are described with the studies on the influence of rain fall and snow fall, etc. by precipitation state, establishment of evaluating and estimating methods of water quality of precipitation, ion-moving degree (hereinafter called "common ion mobility") of precipitation applicable commonly for precipitation at various places of all over Japan,

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\* エネルギー工学科・教授

\*\* 大学院工学研究科機械システム工学専攻博士前期課程・2年

\*\*\* 高周波 casting (株)・研究員

\*\*\*\* エネルギー工学科・技手