

Quantification of chlorine and hydrogen chloride in air using chemically treated filter

Abstract

Air pollution is a major cause of environmental health problems with devastating effects all over the world. In recent years, new techniques of air sampling have been developed for the assessment of air pollutants. In this study, a simplified technique based on the US EPA Test Method 26 was developed to quantify the concentration of Chlorine (Cl_2) and Hydrogen chloride (HCl) in indoor air. The collection of acid gases was compared by liquid absorption between impingers and the chemically treated filter. Results show that there was a linear relationship between the concentration of the acid gases collected and their flow rates in both cases. The chemically treated-filter method was found to quantify both Cl_2 and HCl to a certain sensitivity compared to the impinger method. Errors are inherent in the measurement system. Although the uncertainties cannot be reduced to zero, by quality assurance study, the new methods are viable. Small-sized apparatus, portable, simple to operate and exclusiveness of any volatility are some of the advantages of the developed filter. It was also shown that chemical reaction of Cl_2 with Sodium hydroxide (NaOH), and HCl with Sulphuric acid (H_2SO_4) produced ion chlorides that can be determined instrumentally.