

Institutsseminar

Kinetics of gas-phase ion-molecule reactions for trace gas analyses: selected ion flow tube mass spectrometry

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An overview of the rapid and accurate analyses of trace compounds in air and human breath will be presented, achieved through specialised mass spectrometers using selected ion flow tube mass spectrometry (SIFT-MS). This technique analyses volatile organic compounds and other gases, such as ammonia, hydrogen sulphide, and hydrogen cyanide, at very low concentrations, down to parts per trillion by volume (pptv). SIFT-MS has been widely used in industry and research since its introduction in the mid-1990s. It uses gas-phase ion-molecule reactions to measure concentrations of gases and vapours in the air in real-time. The method is highly efficient because the reagent ions (H_3O^+ , NO^+ , O_2^+ , O^- , OH^- , O_2^- , NO_2^- , and NO_3^-) do not readily react with most air's constituents or only react very slowly. The resulting mass spectra thus reflect the composition of minor admixtures in the air sample based on the fundamental concept of mass spectrometry in general, where each species of analyte results in one or more characteristic ion peaks on the spectra. The presentation will cover the instrumentation used and the underlying physical and chemical principles with interesting examples of its applications in various fields, including recent results on clinical breath analyses and food spoilage monitoring.

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16:15 Uhr

13.06.2024