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Experimental investigation and analysis of continuous flow through trace gas preconcentrator JIHYUN KIM, University of Southern California — It was proposed by Muntz et al. in 2004 to study a micro/mesoscale continuous flow through trace gas preconcentrator, which could avoid the time fidelity problem. The preconcentrator for rarefied trace gas analysis, which is one part of a gas detector or analyzer, has been built and consists of a main flow channel, pumping chambers, and separation membranes that are located upper and lower surface of the main flow channel. The preconcentration is not from stop, adsorption, and release, but is caused by the gradually decreasing cross section of the main flow channel until release through the detection unit such as gas chromatography, mass spectrometry, or optical diagnostics. This has the possibility of achieving concentration increase of various gases in a carrier gas by using relatively simple micro/macroscale mass diffusion separation stages, and is suitable for improving the time accuracy of analytical systems. A series of experiments were conducted in an attempt to validate the available numerical data, such as the concentration and gas flow speed of the newly continuous preconcentration technology. This study involved experimental investigations to obtain a base-line comparison of the existing numerical predictions provided by the prototype preconcentrator.

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