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A portable and robust device based on HPLC

Ali Salehi-Reyhani
King's College London, UK

A major trend in analytical chemistry is the miniaturization of laboratory instrumentation. In this talk, I will explore how a pulseless pump requiring no power to operate can be achieved exploiting the controlled expansion of a pre-pressurized gas. The performance of the gas pump is characterized and integrated into a compact, portable liquid chromatography system capable of isocratic separations integrating an LED-based UV-absorption detector. The system weighed 6.7 kg when the mobile phase reservoirs was fully charged with 150 mL solvent and included an on-board computer to control the system and analyse data. We characterize the flow-rate through chromatography columns with a variety of geometries and packing materials for a range of pressures up to 150 Bar. All tests were made on battery power and results are a mixture of those made in the laboratory and in the field. Additionally, we performed a series of 1 m drop tests on the device and show the system's high tolerance to mechanical shocks during operation in the field.