Development of a Palm Portable Mass Spectrometer

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A palm portable mass spectrometer (PPMS) has been developed with a weight of 1.44 kg (3 lb) and a size of 1547 cm^3 (8.2 x 7.7 x 24.5 cm) that can be operated with a battery with an average power consumption of 5 W. A miniaturized ion trap consists of four parallel disks with a center hole has been used as a mass separator. A small ion getter pump served for maintaining high vacuum inside the chamber and the sample gas was introduced in pulse mode. A micro computer has been developed for controlling various power supplies, RF generation, mass spectrum measurement, data processing, and self diagnosis, etc. The detection sensitivity of the organic gases diluted in the air has been demonstrated up to 6 ppm for TIC and 50 ppm for CWA.

Further development of the PPMS for application in real-time CWA detection /identification, environmental air pollution monitoring, and material analyses in space exploration, on the Mars, Mercury, Moon, and comets, will be discussed in detail.

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