

Transportable sector-field MS with ion detector array

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Monitoring concentrations of gaseous fuels or detecting hydrogen and its contaminants can be challenging. The IonCam is a compact GC/MS system based on a double-focusing sector field mass spectrometer of Mattauch-Herzog geometry. This type of MS separates ions of different mass to charge ratio (m/z) spatially and focuses ions of equal m/z simultaneously in a focal plane, thus creating complete mass spectra at all times. To take advantage of this unique feature a modified charge coupled device (CCD), sensitive to electrical charges (IonCCD) has been developed. The ion-CCD allows the collection of all dispersed ions, recording a complete mass spectrum at a rate of up to 350 mass spectra per second. The 2126 discrete detector elements (pixels) as well as the integrated readout circuitry of the detector are sensitive enough to detect ion currents at the "Atto-Amps" level. The compact size of the IonCam limits its mass range to 250 amu but shows superior mass resolution for small masses. Most gaseous contaminants that are common in hydrogen production can be detected without prior separation.