

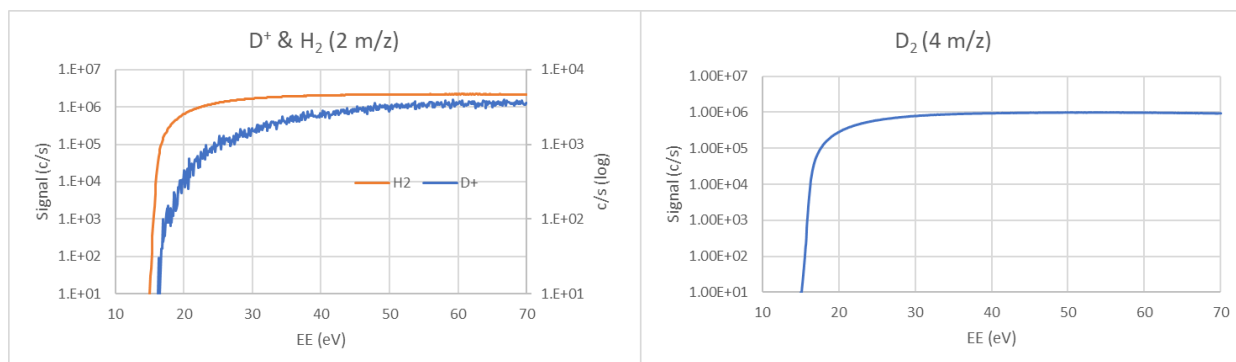
Gas Analysis
Performance Data Sheet PDS-30008

Detection of low level of H₂ in D₂

The limit of detection (LOD) of H₂ in D₂ is affected by the contribution of the fragment D⁺ (2 m/z). Soft ionisation can reduce this contribution from D₂ at 2 m/z allowing ppm levels of H₂ to be detected.

Below are the electron energy scans for D⁺ and H₂ at 2 m/z (left) and D₂ at 4 m/z (right) when flowing 100% of the pure gas in analysis. The electron energy scans have been performed using a DLS-20.

The data shows a clear difference in the electron energy needed to form D⁺ compared with H₂⁺.



In the table below, is shown for each species the percent of the signal for a specific electron energy compared to the signal at 70 eV: at 19eV the signal for D⁺, D₂ and H₂ is 4.5%, 22.5% and 22.4%, respectively. Therefore, using an electron energy of 19 eV gives a reasonable compromise between reduction of the contribution at m/z 2 from deuterium without losing too much signal for D₂ and H₂.

EE (eV)	D+ (%)	D ₂ (%)	H ₂ (%)
16	0	0.29	0.69
17	1.42	5.99	6.92
18	2.27	13.93	14.72
19	4.53	22.52	22.44
20	12.75	30.23	29.90
21	14.73	38.33	37.22
22	19.55	45.98	43.78
23	23.80	52.39	49.86
24	21.81	58.80	55.00
25	28.33	64.43	60.34