Few remarks on Negative Ions gases

Jan Timmermans

From: NIM A526 (2004) 409-412, J. Miyamoto et al.,
GEM operation in negative ion drift gas mixtures

Same gain at different E/p:
1.12 vs. 0.77 V/Torr
(thickness GEM not given)

Same mixture:
17% CS_2 + He at
410 and 700 Torr

Table 1
Gas gains obtained with 3M-GEM in various gas mixtures

Gas mixture	$V_{GEM, max}$	Max gas gain	k
Iso 70 Torr + Ar 630 Torr	270 V	162	—
CS_2 40 Torr	400	729	0.019
CS_2 40 Torr + Ar 660 Torr	400	1540	0.032
CS_2 70 Torr + He 340 Torr	500	2450	0.021
CS_2 120 Torr + He 580 Torr	580	2460	0.025

Only one point (270 V) was taken for the e-gas Ar/Iso. The curves were terminated once a satisfactory gain was achieved; no attempt was made to determine the maximum voltage the GEM would take. The setup was run for about 25 h over 3 days and no instability or sparking was observed at any voltage with any gas mixture. The last column gives the fitted logarithmic slope of the gas gain vs. GEM voltage curves (Gain = $A \exp k V_{GEM}$).

GEM Gain Curves

Legend:
- 70 torr Iso + 630 torr Ar
- 40 torr Carbon Disulfide
- 40 torr Carbon Disulfide + 660 torr Ar
- 70 torr Carbon Disulfide + 340 torr He
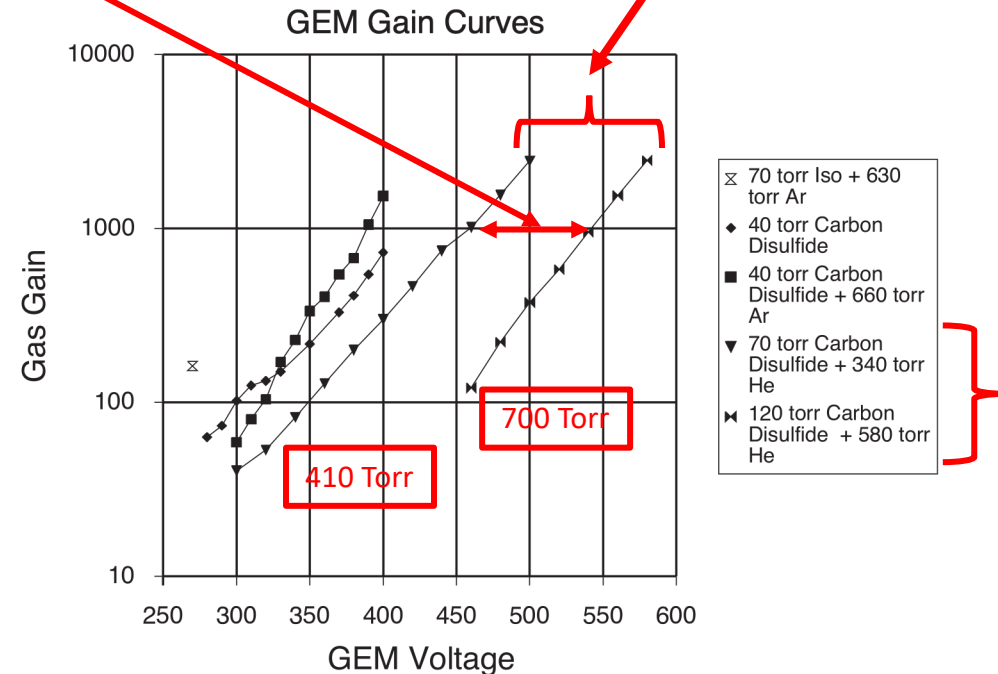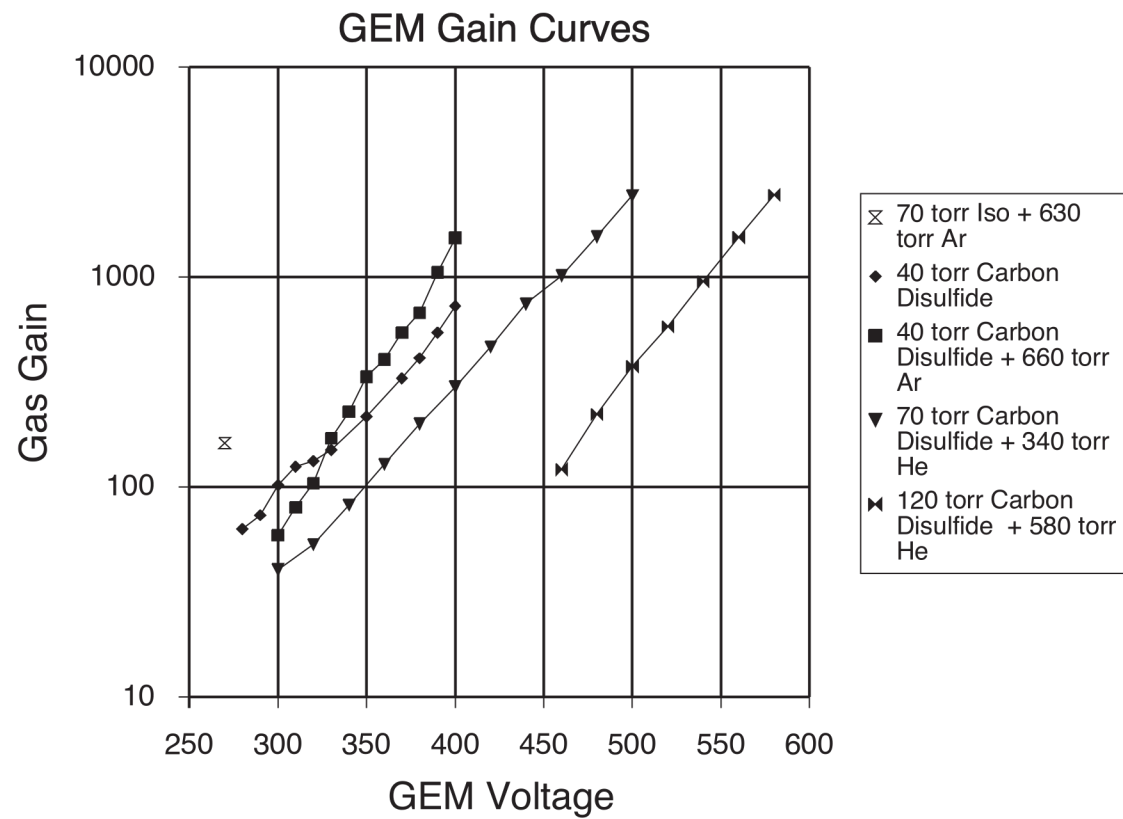- 120 torr Carbon Disulfide + 580 torr He

410 Torr

700 Torr

Fig. 2. Gain vs. V_{GEM} curves for 3M-GEMs exposed to collimated ^{55}Fe source. The single point at 270 V is for the e-gas Ar-Isobutane.

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