

General Characteristics of GC Detectors

Name	Type	Selective For:	Typical Min. Detectible Level (S/N = 2)	Linear Dynamic Range
FID	Selective	Materials that ionize in air/H ₂ flame	5 pg C/sec	10 ⁷
TCD	Universal	Anything with thermal cond. different from carrier	400 pg/ml carrier	10 ⁶
ECD	Selective	Gas-phase electrophores	0.1 pg Cl/sec (varies w/structure)	10 ⁴
PID	Selective	Compounds ionized by UV	2 pg C/sec	10 ⁷
Thermlonic	Selective	N,P, heteroatoms	0.4 pg N/sec 0.2 pg P/sec	10 ⁴
ELCD	Selective	Halogens, N,S	0.5 pg Cl/sec 2 pg S/sec 4 pg N/sec	10 ⁶ 10 ⁴ 10 ⁴
FPD	Specific	P,S	20 pg S/sec 0.9 pg P/sec	10 ³ 10 ⁴
FTIR	Universal	Molecular vibrations	1000 pg of strong absorber	10 ³
MSD	Universal	Tunable for any species	10pg to 10 ng (depending on SIM vs. scan)	10 ⁵
AED	Universal	Tunable for any element	0.1 - 20 pg/sec (depending on element)	10 ⁴

Fig. 10

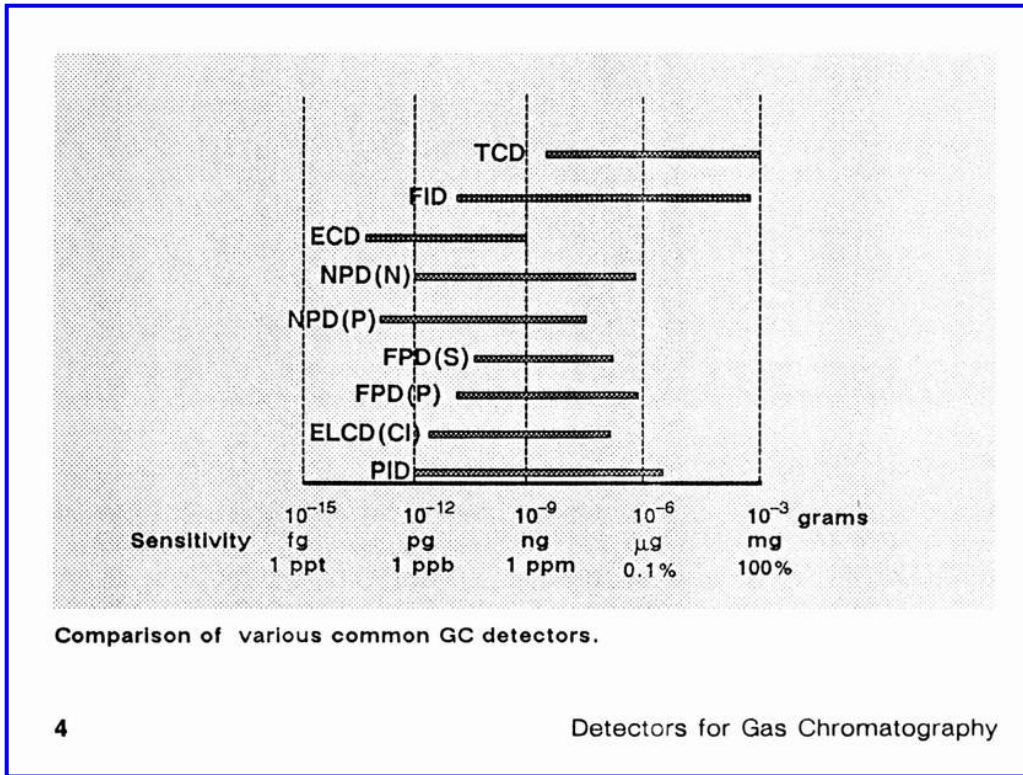


Fig. 11

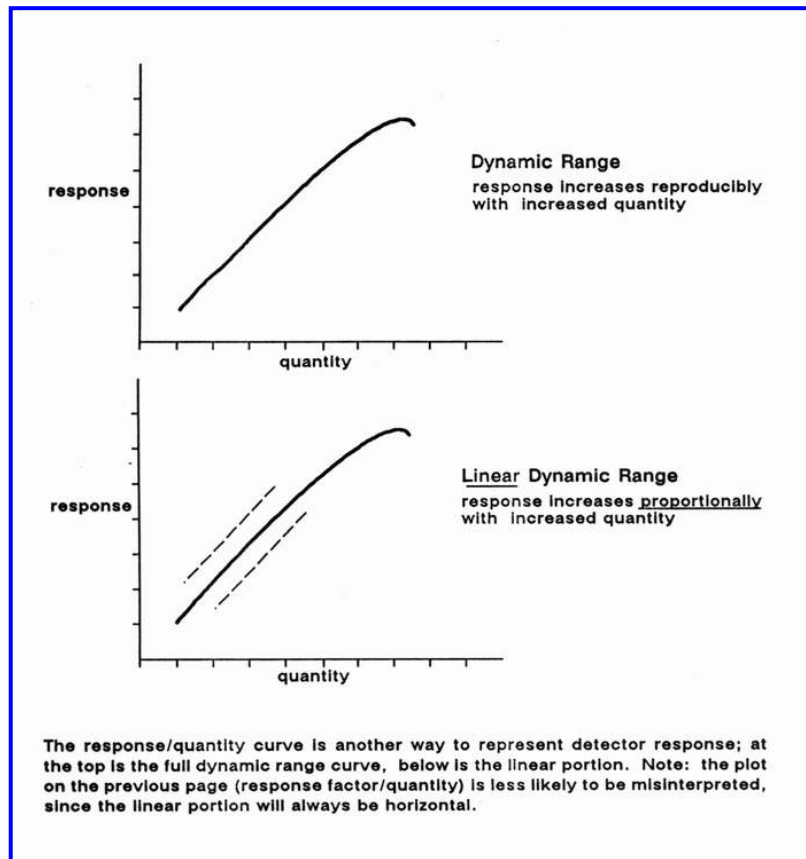
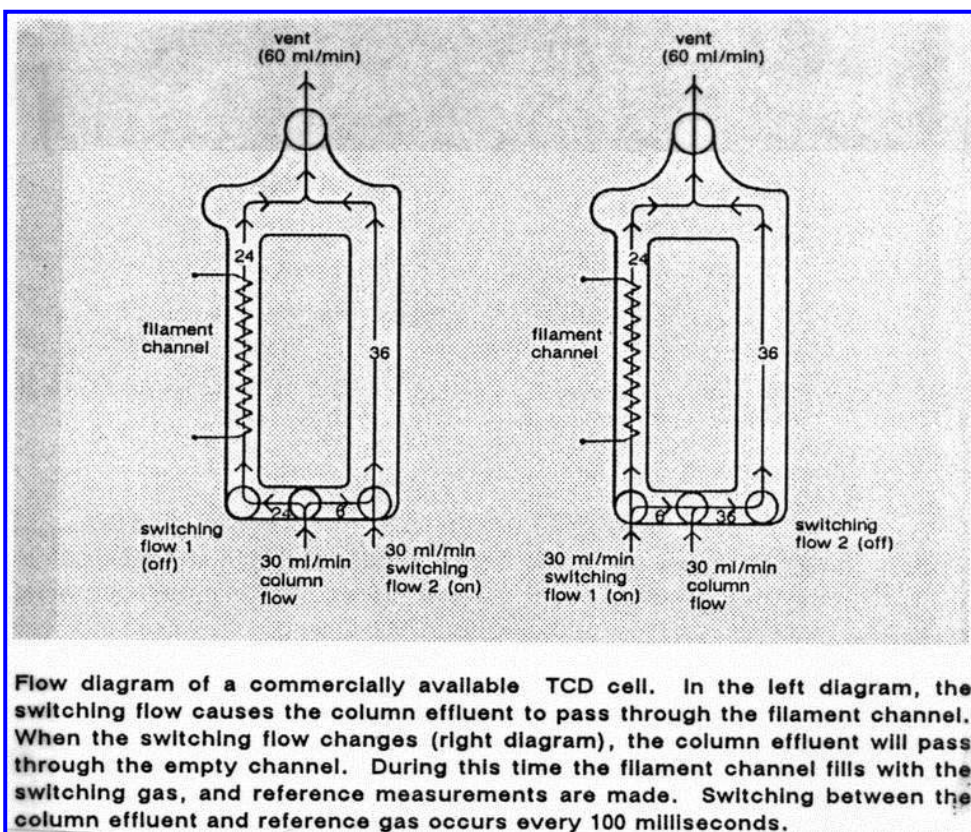


Fig. 12



Flow diagram of a commercially available TCD cell. In the left diagram, the switching flow causes the column effluent to pass through the filament channel. When the switching flow changes (right diagram), the column effluent will pass through the empty channel. During this time the filament channel fills with the switching gas, and reference measurements are made. Switching between the column effluent and reference gas occurs every 100 milliseconds.

Fig. 13

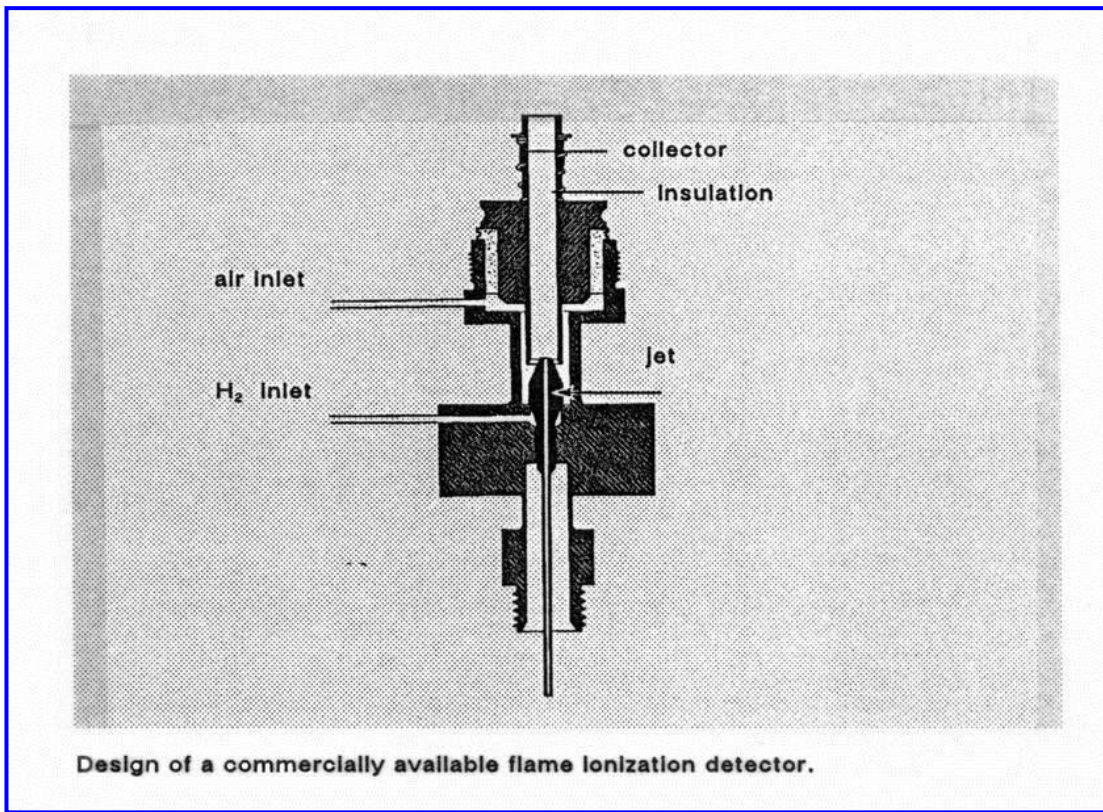


Fig. 14

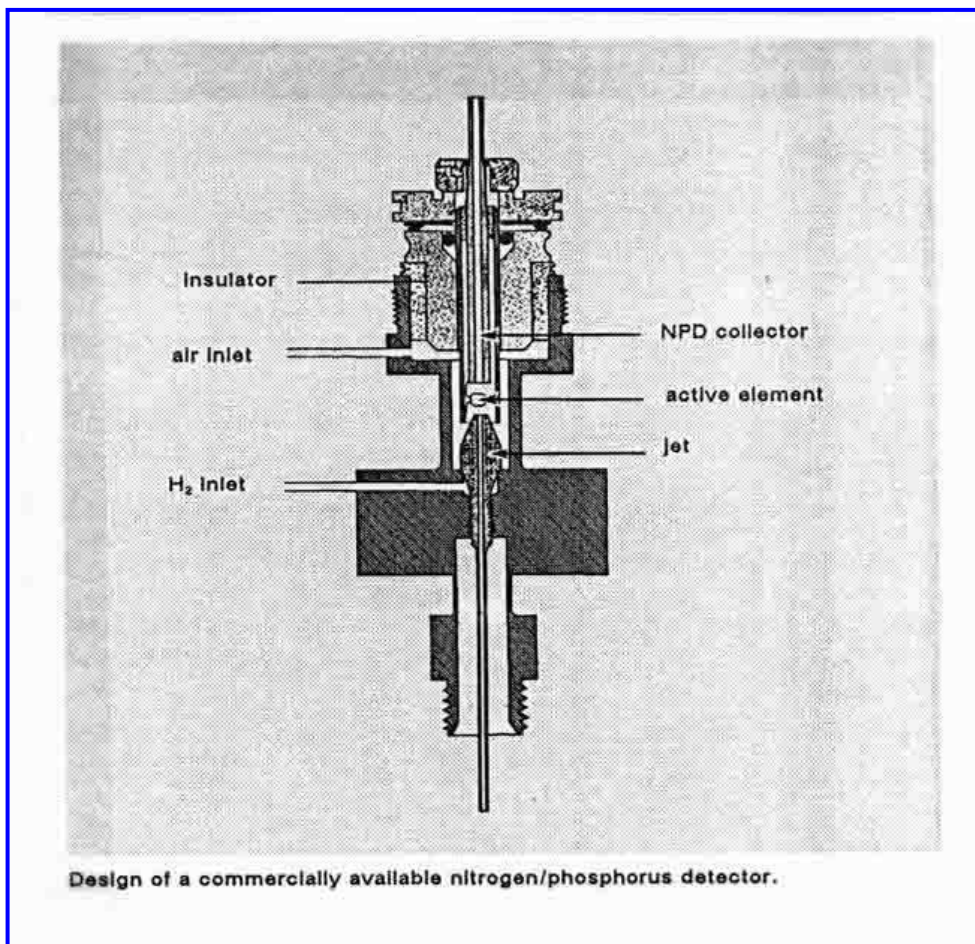


Fig. 15

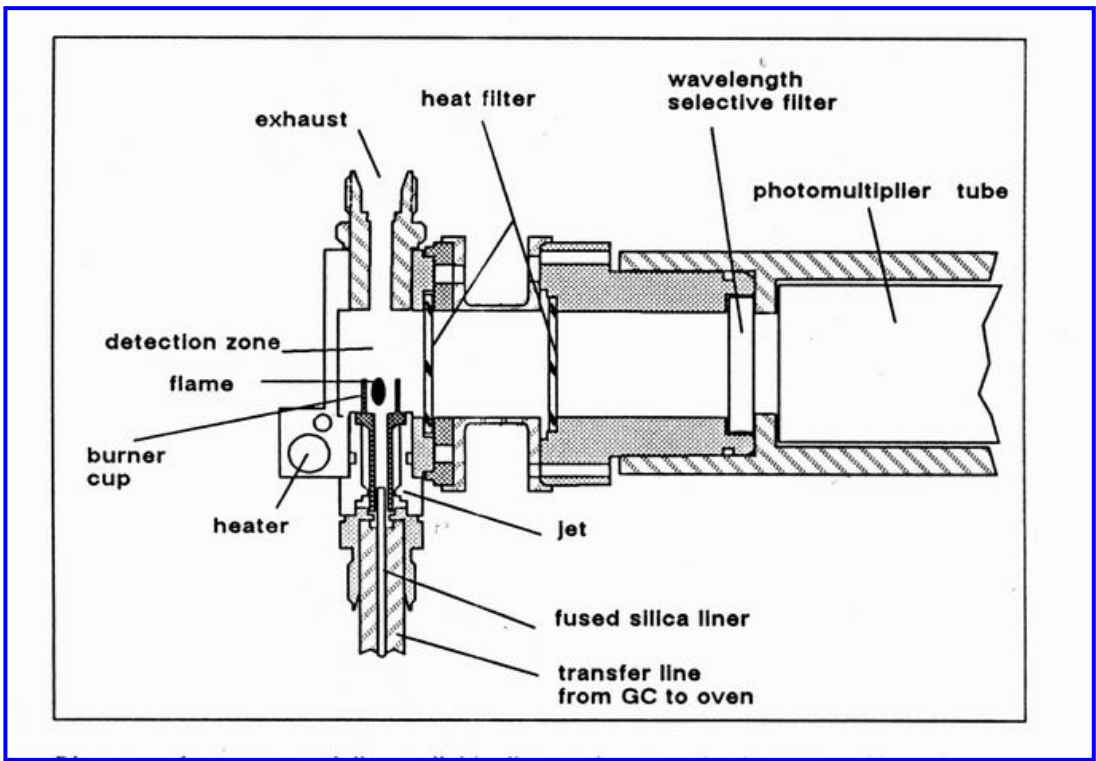


Fig. 16 (FPD)

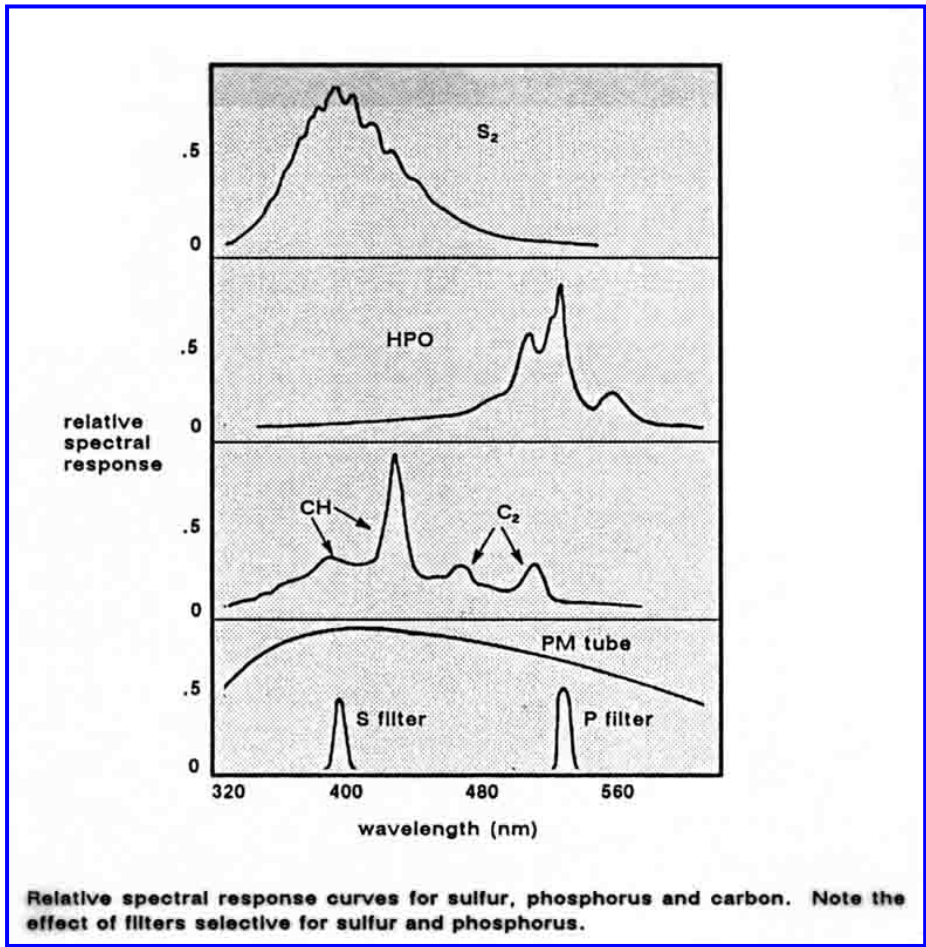


Fig. 17

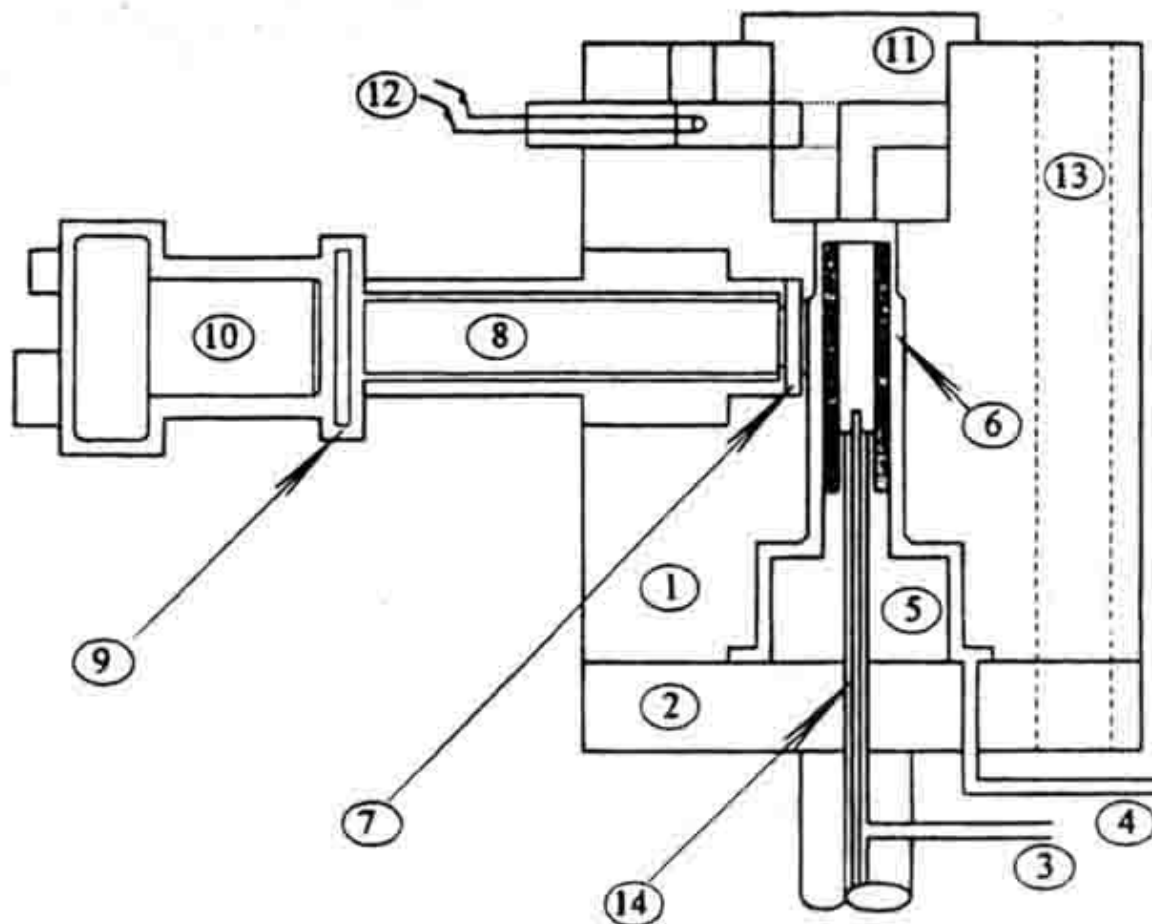


Figure 1. Schematic diagram of the new PFPD design. (1) PFPD body; (2) GC-heated detector base; (3) central hydrogen-rich H₂/air mixture tube leading to the combustor; (4) outer bypass H₂/air mixture tube; (5) combustor holder (6) quartz combustor tube; (7) sapphire window; (8) light guide; (9) colored glass filter; (10) photomultiplier; (11) spiral igniter light shield; (12) heated wire igniter; (13) assembly guiding rod in a guiding hole; (14) column.

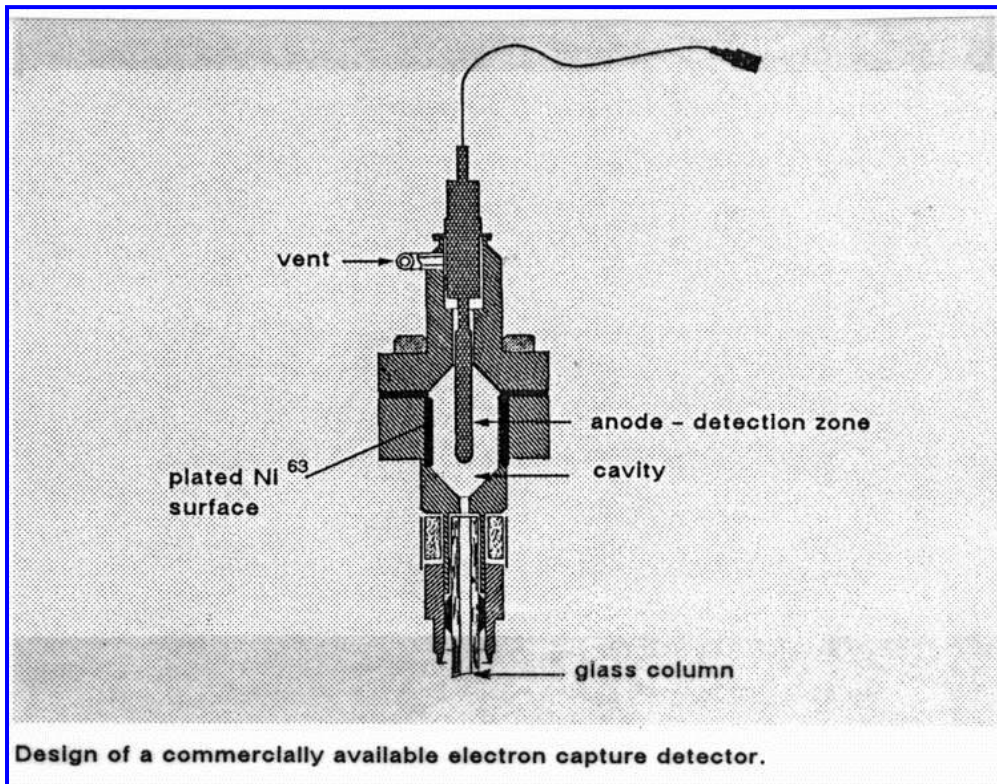


Fig. 19

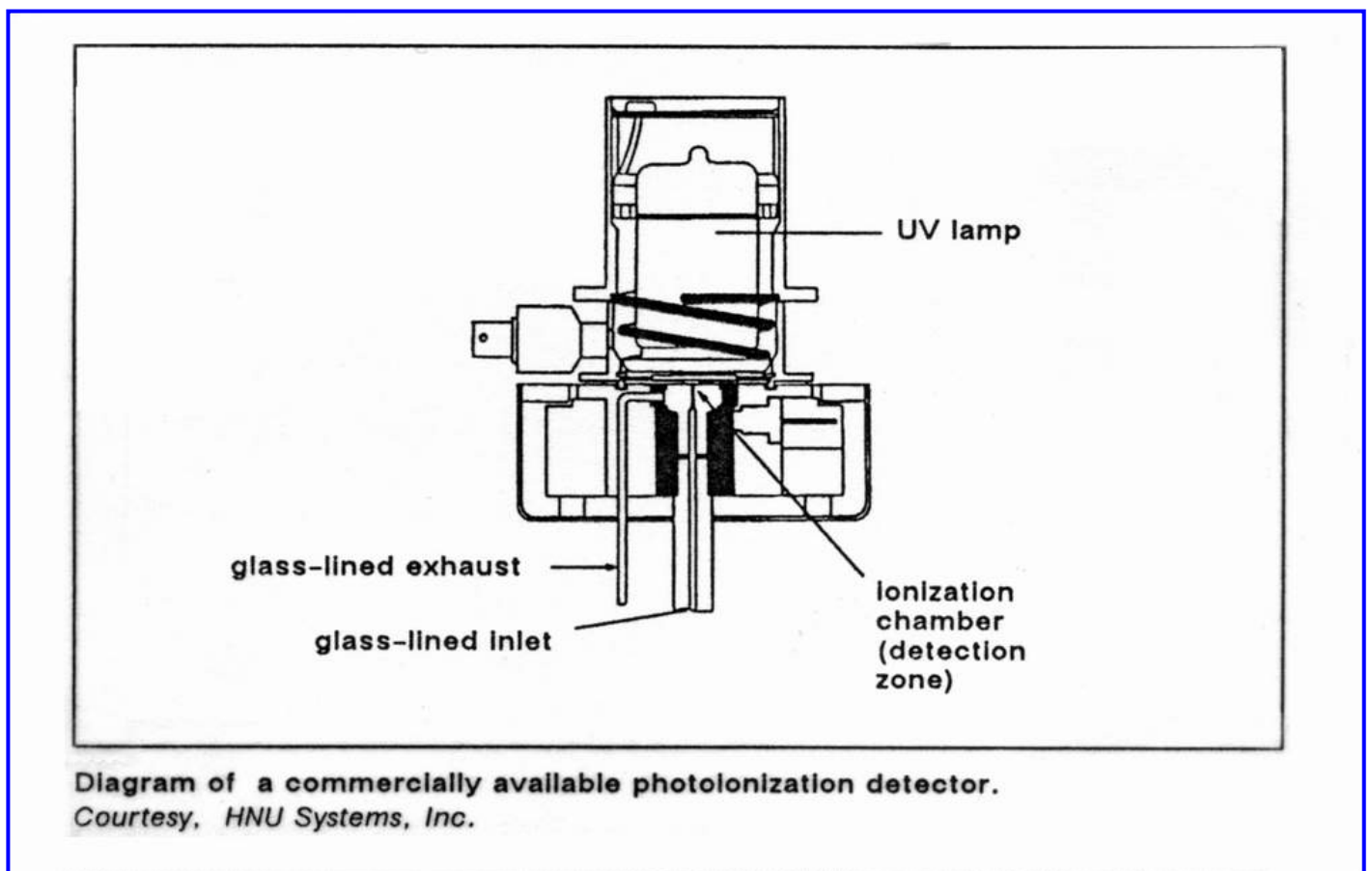


Fig. 20