Appendix 12

APPEARANCE OF DISCHARGES IN GASES AND VAPOURS AT LOW PRESSURES*

Gas	*Negative Glow*	*Positive Column*
Air	Blue	(Reddish)
Nitrogen	Blue	Yellow (Red gold)
Oxygen	Yellowish white	Lemon
Hydrogen	Bluish pink (Bright blue)	Pink (Rose)
Helium	Pale green	Violet red
Argon	Bluish	Deep red (violet)
Neon	Red-orange	Red-orange (Blood red)
Krypton	Green	——
Xenon	Bluish-white	——
Carbon monoxide	Greenish-white	(White)
Carbon dioxide	Blue	(White)
Methane	Reddish-violet	——
Ammonia	Yellow-green	——
Chlorine	Greenish	Light green
Bromine	Yellowish green	Reddish
Iodine	Orange-yellow	Peach blossom coloured
Lithium	Bright red	——
Sodium	Yellowish green (Whitish)	Yellow
Potassium	Green	Green
Mercury	Green (goldish white)	Greenish-blue (greenish)

—— indicates no distinctive colour given.

* *Lehrbuch der Physik*; *IV. Elektrizitat und Magnetismus*, 3rd part, p. 373; Espe-Knoll, *Werkstoffkunde der Hochvakuum Technik*, p. 240, colour in brackets.

Appendix 13

MEAN FREE PATHS*

Gas	*Temperature*	*Mean Free Path at Pressure:* 760 *mm. Hg.*	1 *mm. Hg.*	.001 *mm. Hg.*
Air	20°C.	.000,093 mm.	.071 mm.	71 mm.
Hydrogen	,,	.000,17 ,,	.13 ,,	130 ,,
Helium	,,	.000,27 ,,	.205 ,,	205 ,,
Ammonia	,,	.000,065 ,,	.050 ,,	50 ,,
Carbon monoxide	,,	.000,091 ,,	.069 ,,	69 ,,
Nitrogen	,,	.000,092 ,,	.070 ,,	70 ,,
Oxygen	,,	.000,098 ,,	.074 ,,	74 ,,
Argon	,,	.000,097 ,,	.074 ,,	74 ,,
Carbon dioxide	,,	.000,061 ,,	.046 ,,	46 ,,
Water vapour	300°C.	.000,071 ,,	.054 ,,	54 ,,
Mercury vapour	,,	.000,145 ,,	.11 ,,	110 ,,

* This table is based on Dushman's calculated values, *Gen. Elec. Rev.* 18, 1045 (1915), using Boltzmann's formula: $L = \eta/0.3502\rho\Omega$, where L is the mean free path, η the coefficient of viscosity, and Ω the average velocity.

In calculating the values for low pressures, the mean free path has been assumed to vary inversely with pressure. Experimental evidence (e.g., Franck and Hertz) for hydrogen down to pressures of 10^{-4} — 10^{-5} mm. supports the above assumption.

Appendix 14

DENSITIES OF GASES

	Density ρ_0 *gm.cm.*$^{-3}$ *at* 0°*C.*, 760 *mm. Hg.*	*Density* ρ_1 *gm.cm.*$^{-3}$ *at* 20°*C.*, 1 *dyne per cm.*^{2}	$\sqrt{\rho_1}$
Air	1.293×10^{-3}	11.9×10^{-10}	3.45×10^{-5}
Hydrogen	0.090 ,,	.83 ,,	.91 ,,
Helium	.178 ,,	1.64 ,,	1.28 ,,
Ammonia	.771 ,,	7.1 ,,	2.66 ,,
Carbon monoxide	1.250 ,,	11.5 ,,	3.39 ,,
Nitrogen	1.257 ,,	11.6 ,,	3.40 ,,
Oxygen	1.429 ,,	13.1 ,,	3.62 ,,
Argon	1.784 ,,	16.4 ,,	4.05 ,,
Carbon dioxide	1.974 ,,	18.2 ,,	4.26 ,,