

TABLE I (Continued)

Pressure (atm)	Density (g/cm ³)	Viscosity (μP)	Pressure (atm)	Density (g/cm ³)	Viscosity (μP)
Ar, 25°C			141.92	0.40000	274.60±0.17
7.30	0.01198	226.61±0.03	155.02	0.44000	290.93±0.21
14.54	0.02396	228.28±0.09	168.72	0.48000	308.85±0.18
28.85	0.04792	231.38±0.08	Ar, -100°C		
42.95	0.07189	235.44±0.05	6.89	0.02000	139.82±0.23
56.87	0.09585	239.66±0.14	13.33	0.04000	141.84±0.15
70.66	0.11981	244.22±0.09	19.36	0.06000	144.51±0.19
84.35	0.14377	249.26±0.10	19.36	0.06000	144.84±0.31
111.60	0.19170	260.72±0.10	27.64	0.09000	148.39±0.08
138.93	0.23962	273.40±0.11	35.09	0.12000	153.72±0.19
166.70	0.28754	287.24±0.10	43.85	0.16000	161.32±0.06
Ar, -50°C			51.44	0.20000	169.26±0.27
4.54	0.01000	176.41±0.02	59.56	0.25000	181.76±0.17
9.00	0.02000	177.36±0.04	66.45	0.30000	195.60±0.20
17.68	0.04000	179.78±0.11	72.43	0.35000	210.98±0.48
26.06	0.06000	182.64±0.06	77.78	0.40000	229.72±0.14
34.15	0.08000	185.71±0.11	82.79	0.45000	251.15±0.98
41.98	0.10000	189.15±0.10	87.76	0.50000	273.23±0.19
49.57	0.12000	192.85±0.07	93.01	0.55000	299.55±0.72
64.10	0.16000	200.92±0.09	98.96	0.60000	329.45±0.45
77.90	0.20000	210.35±0.10	106.12	0.65000	360.02±0.23
91.14	0.24000	220.98±0.15	115.17	0.70000	396.55±0.15
103.98	0.28000	232.53±0.17	126.96	0.75000	436.04±0.40
116.60	0.32000	245.24±0.16	142.61	0.80000	479.25±0.52
129.19	0.36000	259.12±0.15	158.86	0.84000	520.37±0.25

extrapolation of our -90°C curve indicates that Zhdanova's²³ results for $\rho \geq 0.38$ g/cm³ are as much as 20% too high.

Helium

Helium²⁴ was also studied at 25, -50, and -90°C; the results are shown in Fig. 2. The densities are based on the work of Miller *et al.*²⁵ at 25°C and of Canfield *et al.*¹⁶ elsewhere. We are again in good agreement with our previous work¹ and about 0.3% lower than the results of Kestin *et al.*¹⁸ around 25°C. At -50 and -90°C,

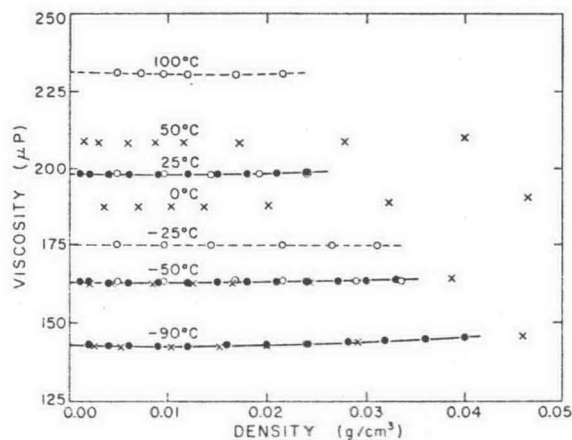


Fig. 2. Viscosity of helium vs density: ●, present results; ○, Flynn, Hanks, Lemaire, and Ross¹; ×, Kao and Kobayashi.²

²³ N. F. Zhdanova, Zh. Eksp. Teor. Fiz. 31, 14 (1956) [Sov. Phys.—JETP 4, 19 (1957)].
²⁴ Purity 99.995%, from Matheson Co.
²⁵ J. E. Miller, L. W. Brandt, and L. Stroud, U.S. Bur. Mines, Rept. Invest. No. 5845 (1961).

Kao and Kobayashi's³ results average 0.2%-0.3% lower than ours. Golubev and Gnezdilov²⁶ obtain viscosities consistently steeper in the density than all the above work, but closely resembling those of Ross and Brown, which we regard as unreliable.¹ Kestin's results, Kao and Kobayashi's, and ours all tend to confirm the existence of very shallow minima in the viscosity-density curves.

Hydrogen

Hydrogen²⁷ was studied at 25, -50, and -100°C; the results are shown in Fig. 3. The densities were all taken

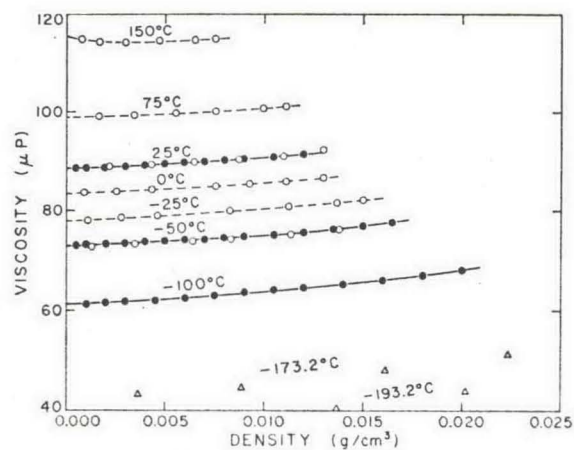


Fig. 3. Viscosity of hydrogen vs density: ●, present results; ○, Barua, Afzal, Flynn, and Ross¹; Δ, Diller.⁴

²⁶ I. F. Golubev and N. E. Gnezdilov, Gazov. Prom. 10, 38 (1965).
²⁷ Purity 99.95%, from Matheson Co.