Table 1 Compressibility factor of argon-ammonia system at 50°C

P, atm	$Z=PV/RT$ Composition, mol% Ar 100.0 NH_3 0.0	Ar 91.8 NH_3 8.2	Ar 83.9 NH_3 16.1	Ar 63.5 NH_3 36.5	Ar 0.0 NH_3 100.0
0	1.0000	1.0000	1.0000	1.0000	1.0000
2	0.9992	0.9985	0.9981	0.9962	0.9856
4	0.9984	0.9973	0.9964	0.9925	0.9704
6	0.9975	0.9960	0.9947	0.9888	0.9544
8	0.9967	0.9949	0.9931	0.9852	0.9372
10	0.9960	0.9937	0.9916	0.9816	0.9188
12	0.9951	0.9925	0.9900	0.9780	0.8993
14	0.9943	0.9915	0.9885	0.9744	0.8793
16	0.9935	0.9904	0.9870	0.9708	0.8592
18	0.9928	0.9894	0.9855	0.9674	0.8385
20	0.9923	0.9883	0.9840	0.9640	
22	0.9915	0.9872	0.9826	0.9606	
24	0.9907	0.9863	0.9812	0.9572	
26	0.9900	0.9854	0.9800	0.9538	
28	0.9894	0.9845	0.9786	0.9505	
30	0.9888	0.9836	0.9773	0.9471	
40	0.9856	0.9798	0.9714		
50	0.9827	0.9767	0.9663		

Table 1 (continued)

$1/V$, mol/l	$Z=PV/RT$ Composition, mol% Ar 100.0 NH_3 0.0	Ar 91.8 NH_3 8.2	Ar 83.9 NH_3 16.1	Ar 63.5 NH_3 36.5	Ar 0.0 NH_3 100.0
0	1.0000	1.0000	1.0000	1.0000	1.0000
0.2	0.9978	0.9967	0.9955	0.9903	0.9595
0.4	0.9957	0.9934	0.9913	0.9810	0.9195
0.6	0.9937	0.9905	0.9872	0.9719	0.8798
0.8	0.9917	0.9878	0.9835	0.9632	0.8393
1.0	0.9899	0.9853	0.9799	0.9548	
1.2	0.9881	0.9831	0.9766	0.9468	
1.4	0.9865	0.9810	0.9736		
1.6	0.9849	0.9792	0.9707		
1.8	0.9835	0.9776	0.9681		
2.0	0.9820	0.9763	0.9657		

Table 2 Experimental equations of state for argon-ammonia system at 50°C

Composition, mol%	$Z = 1 + B(1/V) + C(1/V)^2 + D(1/V)^3$,			$1/V$, mol/l
Ar — NH_3	B	C	D	Range of $1/V$
100.0 — 0.0	−0.01124	0.00113	—	up to 2.0
91.8 — 8.2	−0.01748	0.00282	—	up to 1.9
83.9 — 16.1	−0.02296	0.00291	—	up to 1.89
63.5 — 36.5	−0.04397	0.00420	—	up to 1.16
0.0 — 100.0	−0.2172	0.0628	−0.0566	up to 0.9
Composition, mol%	$Z = 1 + B'P + C'P^2 + D'P^3$,			P, atm
Ar — NH_3	$B' \cdot 10^3$	$C' \cdot 10^6$	$D' \cdot 10^6$	Range of P
100.0 — 0.0	−0.417	1.44	—	up to 50
91.8 — 8.2	−0.667	4.05	—	up to 49
83.9 — 16.1	−0.883	4.19	—	up to 48
63.5 — 36.5	−1.869	3.38	—	up to 29
0.0 — 100.0	−7.477	−34.6	−2.90	up to 19

Nitrogen-ammonia system

The compressibility factors were measured at 50°C and up to 50 atm for three kinds of the binary mixtures of nitrogen-ammonia as below :

87.3 mol% N_2 − 12.7 mol% NH_3,

77.0 mol% N_2 − 23.0 mol% NH_3,

62.3 mol% N_2 − 37.7 mol% NH_3.

The smoothed values of Z were obtained by the same method as in the case of the above argon-ammonia mixtures. They were in agreement with the experimental values within the deviation of 0.2%. They are shown in Table 3. In the table, the values of pure ammonia in the previous work[1)] and the values of pure nitrogen in the previous work[5)] were also represented.

The experimental equations of state were obtained in the same manner as in the case of argon-ammonia systems. The results are shown in Table 4. The values of Z calculated by these equations were in agreement with the experimental values within the deviation of 0.2%.

Consideration on the second virial coefficients of the mixtures

The values of B in Tables 2 and 4 can be looked upon as the experimental second virial coefficients of the mixtures though they are not so accurate because they were obtained only from the experimental P-V-T data at higher pressures than several atmospheres.

5) K. Date and H. Iwasaki, *Annual Report of the Asahi Glass Foundation for the Contribution to Industrial Technology*, **11**, 65 (1965)