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ERRATUM

Erratum to: The gas flow diode effect: theoretical and experimental analysis of moderately rarefied gas flows through a microchannel with varying cross section

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In the original publication of the article, Eq. (13) is incorrect. This is a result of a mistake occurring during the typesetting stage of the article and it does not affect any of the other results or equations in the article. The correct version of the equation is given below:

$$Q^H = \frac{2}{3}\left(P_1^2 - P_2^2\right)\frac{H_2^2}{H_2 + 1} \tag{13}$$

Further, a small mistake occurred when calculating the standard deviation of the experimental results provided in Tables 2, 3, 4, 5, 6 and 7. The mean of all values, however, was stated correctly and the mistake does not affect Fig. 4 visibly. The tables with correct standard deviation are given in the following:

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Table 2 Experimental results obtained in *diffusor* direction on the tapered channel according to Fig. 2 with CO_2 as working gas, analytical solution, numerical solution

p_1 (kPa)	p_2 (kPa)	T_0 (°C)	$\dot{M}$ (10^{-9} kg s^{-1})			α (%)
			Exp.	Anal.	Num.	Num.
23.0389 ± 0.0963	3.0266 ± 0.0949	20.04	2.411 ± 0.047	2.6041	2.7810	13.3
28.3679 ± 0.0852	3.3626 ± 0.0943	20.03	3.404 ± 0.045	3.5473	3.7466	9.1
33.7133 ± 0.0746	3.7084 ± 0.0721	20.05	4.513 ± 0.047	4.6146	4.8329	6.6
39.0586 ± 0.0887	4.0720 ± 0.0768	20.05	5.733 ± 0.049	5.8039	6.0353	5.0
44.4236 ± 0.0821	4.4461 ± 0.0797	20.05	7.067 ± 0.059	7.1204	7.3634	4.0
55.1305 ± 0.0816	5.1696 ± 0.0639	20.07	10.049 ± 0.074	10.1177	10.3803	3.2
66.1574 ± 0.0712	5.9504 ± 0.0662	20.06	13.653 ± 0.080	13.7189	13.9981	2.5

Measurements were performed in triplicate and arithmetic mean and standard deviation are calculated. The deviation α of the numerical solution to the experimental results is: $\left| (\dot{M}_{exp}/\dot{M}_{num}) - 1 \right| \cdot 100\%$

Table 3 Experimental results obtained in *nozzle* direction on the tapered channel according to Fig. 2 with CO_2 as working gas, analytical solution, numerical solution

p_1 (kPa)	p_2 (kPa)	T_0 (°C)	$\dot{M}$ (10^{-9} kg s^{-1})			α (%)
			Exp.	Anal.	Num.	Num.
23.0154 ± 0.0459	3.0140 ± 0.0358	20.10	2.588 ± 0.042	3.1587	3.2192	19.6
28.3679 ± 0.0530	3.3753 ± 0.0374	20.10	3.656 ± 0.052	4.2626	4.3396	15.8
33.7229 ± 0.0596	3.7466 ± 0.0415	20.10	4.847 ± 0.046	5.4891	5.5829	13.2
39.0837 ± 0.0634	4.1230 ± 0.0514	20.07	6.139 ± 0.061	6.8407	6.9516	11.7
44.4620 ± 0.0603	4.5079 ± 0.0442	20.07	7.542 ± 0.053	8.3193	8.4468	10.7
55.1912 ± 0.0522	5.2426 ± 0.0376	20.08	10.662 ± 0.065	11.6449	11.8047	9.7
66.2069 ± 0.0694	6.0228 ± 0.0435	20.05	14.354 ± 0.099	15.5730	15.7628	8.9

Measurements were performed in triplicate and arithmetic mean and standard deviation are calculated. The deviation α of the numerical solution to the experimental results is: $\left| (\dot{M}_{exp}/\dot{M}_{num}) - 1 \right| \cdot 100\%$

Table 4 Experimental results obtained in *diffusor* direction on the tapered channel according to Fig. 2 with N_2 as working gas, analytical solution, numerical solution

p_1 (kPa)	p_2 (kPa)	T_0 (°C)	$\dot{M}$ (10^{-9} kg s^{-1})			α (%)
			Exp.	Anal.	Num.	Num.
25.5150 ± 0.0955	3.3040 ± 0.0581	20.08	1.722 ± 0.044	2.0490	2.2330	22.9
31.4279 ± 0.0680	3.6811 ± 0.0295	20.08	2.431 ± 0.040	2.7513	2.9595	17.9
37.3339 ± 0.0457	4.0762 ± 0.0531	20.05	3.223 ± 0.011	3.5326	3.7636	14.4
43.2610 ± 0.0577	4.4717 ± 0.0475	20.06	4.095 ± 0.013	4.3972	4.6453	11.8
49.1804 ± 0.0175	4.8795 ± 0.0108	20.07	5.048 ± 0.034	5.3408	5.6053	9.9
61.0077 ± 0.0474	5.6739 ± 0.0210	20.06	7.178 ± 0.043	7.4699	7.7561	7.5
73.2224 ± 0.0176	6.5315 ± 0.0254	20.06	9.751 ± 0.023	10.0061	10.3127	5.4

Measurements were performed in triplicate and arithmetic mean and standard deviation are calculated. The deviation α of the numerical solution to the experimental results is: $\left| (\dot{M}_{exp}/\dot{M}_{num}) - 1 \right| \cdot 100\%$

Table 5 Experimental results obtained in *nozzle* direction on the tapered channel according to Fig. 2 with N_2 as working gas, analytical solution, numerical solution

p_1 (kPa)	p_2 (kPa)	T_0 (°C)	$\dot{M}$ (10^{-9} kg s^{-1})			α (%)
			Exp.	Anal.	Num.	Num.
25.4982 ± 0.0234	3.3167 ± 0.0131	20.08	1.848 ± 0.027	2.5415	2.5966	28.8
31.4365 ± 0.0376	3.7172 ± 0.0181	20.12	2.611 ± 0.019	3.3859	3.4543	24.4
37.0293 ± 0.0284	4.0850 ± 0.0142	20.10	3.462 ± 0.019	4.2574	4.3394	20.2
42.9162 ± 0.0304	4.4908 ± 0.0212	20.26	4.384 ± 0.034	5.2477	5.3447	18.0
48.8057 ± 0.0230	4.9114 ± 0.0696	20.26	5.387 ± 0.012	6.3192	6.4314	16.2
60.6650 ± 0.0216	5.7264 ± 0.0327	20.31	7.615 ± 0.023	8.7218	8.8644	14.1
72.7721 ± 0.0331	6.5730 ± 0.0234	20.09	10.252 ± 0.020	11.5187	11.6916	12.3

Measurements were performed in triplicate and arithmetic mean and standard deviation are calculated. The deviation α of the numerical solution to the experimental results is: $\left| (\dot{M}_{exp}/\dot{M}_{num}) - 1 \right| \cdot 100\,\%$

Table 6 Experimental results obtained in *diffusor* direction on the tapered channel according to Fig. 2 with Ar (argon) as working gas, analytical solution, numerical solution

p_1 (kPa)	p_2 (kPa)	T_0 (°C)	$\dot{M}$ (10^{-9} kg s^{-1})			α (%)
			Exp.	Anal.	Num.	Num.
24.1557 ± 0.0517	3.1894 ± 0.0273	20.29	1.855 ± 0.035	2.2111	2.4305	23.7
29.8508 ± 0.0545	3.5046 ± 0.0275	20.30	2.619 ± 0.053	2.9675	3.2207	18.7
35.0942 ± 0.0649	3.8842 ± 0.0242	20.30	3.494 ± 0.049	3.7328	4.0099	12.9
40.4200 ± 0.0402	4.2844 ± 0.0281	20.29	4.440 ± 0.039	4.5815	4.8817	9.0
46.0627 ± 0.0674	4.6966 ± 0.0457	20.30	5.459 ± 0.057	5.5599	5.8788	7.1
57.1809 ± 0.0531	5.4635 ± 0.0570	20.30	7.762 ± 0.072	7.7283	8.0797	3.9
68.6523 ± 0.0605	6.2922 ± 0.0259	20.48	10.537 ± 0.073	10.2871	10.6610	1.2

Measurements were performed in triplicate and arithmetic mean and standard deviation are calculated. The deviation α of the numerical solution to the experimental results is: $\left| (\dot{M}_{exp}/\dot{M}_{num}) - 1 \right| \cdot 100\,\%$

Table 7 Experimental results obtained in *nozzle* direction on the tapered channel according to Fig. 2 with Ar (argon) as working gas, analytical solution, numerical solution

p_1 (kPa)	p_2 (kPa)	T_0 (°C)	$\dot{M}$ (10^{-9} kg s^{-1})			α (%)
			Exp.	Anal.	Num.	Num.
23.9157 ± 0.0294	3.2167 ± 0.0346	20.08	1.998 ± 0.023	2.7266	2.7895	28.4
29.4861 ± 0.0311	3.5476 ± 0.0420	20.06	2.822 ± 0.023	3.6227	3.6999	23.7
34.8385 ± 0.0409	3.9118 ± 0.0374	20.04	3.759 ± 0.032	4.5532	4.6453	19.1
40.3653 ± 0.0440	4.2902 ± 0.0286	20.06	4.762 ± 0.048	5.5904	5.6985	16.4
46.0374 ± 0.0501	4.6987 ± 0.0596	20.31	5.832 ± 0.043	6.7281	6.8533	14.9
57.1578 ± 0.0368	5.4656 ± 0.0331	20.33	8.245 ± 0.045	9.2108	9.3707	12.0
68.6183 ± 0.0449	6.2951 ± 0.0431	20.33	11.092 ± 0.056	12.0960	12.2903	9.8

Measurements were performed in triplicate and arithmetic mean and standard deviation are calculated. The deviation α of the numerical solution to the experimental results is: $\left| (\dot{M}_{exp}/\dot{M}_{num}) - 1 \right| \cdot 100\,\%$

Furthermore, a mistake occurred when calculating $\bar{Kn}$ according to Eq. (11) with $\bar{p} = 0.25(p_1^{noz} + p_2^{noz} + p_1^{dif} + p_2^{dif})$. The corrected values are given in Tables 8, 9 and 10 below:

Table 8 Mean Knudsen number and experimental and numerically calculated diodicity of carbon dioxide (CO_2) at 20.07 °C

$\bar{Kn}$	D		α (%)
	Exp.	Num.	Num.
0.2382 ± 0.0447	1.0755 ± 0.0284	1.1598	7.27
0.1955 ± 0.0367	1.0742 ± 0.0218	1.1584	7.27
0.1657 ± 0.0311	1.0737 ± 0.0157	1.1548	7.02
0.1437 ± 0.0270	1.0696 ± 0.0148	1.1506	7.04
0.1268 ± 0.0238	1.0657 ± 0.0123	1.1455	6.96
0.1028 ± 0.0193	1.0588 ± 0.0105	1.1350	6.71
0.0860 ± 0.0161	1.0500 ± 0.0098	1.1246	6.63

$\bar{Kn}$ and D are calculated according to Eqs. (11), (23), (30) and (31) using values stated in Tables 1, 2 and 3. The deviation α of the numerical solution to the experimental results is: $\left| (D_{exp}/D_{num}) - 1 \right| \cdot 100\,\%$

Table 9 Mean Knudsen number and experimental and numerically calculated diodicity of nitrogen (N_2) at 20.12 °C

$\bar{Kn}$	D		α (%)
	Exp.	Num.	Num.
0.3849 ± 0.0722	1.0745 ± 0.0319	1.1646	7.74
0.3157 ± 0.0592	1.0743 ± 0.0194	1.1669	7.93
0.2688 ± 0.0504	1.0920 ± 0.0073	1.1723	6.85
0.2332 ± 0.0437	1.0880 ± 0.0094	1.1694	6.96
0.2059 ± 0.0386	1.0838 ± 0.0078	1.1654	7.00
0.1668 ± 0.0313	1.0732 ± 0.0072	1.1562	7.18
0.1394 ± 0.0261	1.0646 ± 0.0034	1.1480	7.27

$\bar{Kn}$ and D are calculated according to Eqs. (11), (23), (30) and (31) using values stated in Tables 1, 4 and 5. The deviation α of the numerical solution to the experimental results is: $\left| (D_{exp}/D_{num}) - 1 \right| \cdot 100\,\%$

Table 10 Mean Knudsen number and experimental and numerically calculated diodicity of argon (Ar) at 20.25 °C

$\bar{Kn}$	D		α (%)
	Exp.	Num.	
0.4097 ± 0.0768	1.0993 ± 0.0241	1.1716	6.17
0.3362 ± 0.0630	1.1053 ± 0.0241	1.1782	6.19
0.2871 ± 0.0538	1.0921 ± 0.0181	1.1759	7.13
0.2498 ± 0.0468	1.0755 ± 0.0145	1.1706	8.12
0.2200 ± 0.0413	1.0697 ± 0.0140	1.1671	8.34
0.1783 ± 0.0334	1.0630 ± 0.0115	1.1607	8.42
0.1491 ± 0.0280	1.0538 ± 0.0091	1.1540	8.68

$\bar{Kn}$ and D are calculated according to Eqs. (11), (23), (30) and (31) using values stated in Tables 1, 6 and 7. The deviation α of the numerical solution to the experimental results is: $\left| (D_{exp}/D_{num}) - 1 \right| \cdot 100\,\%$

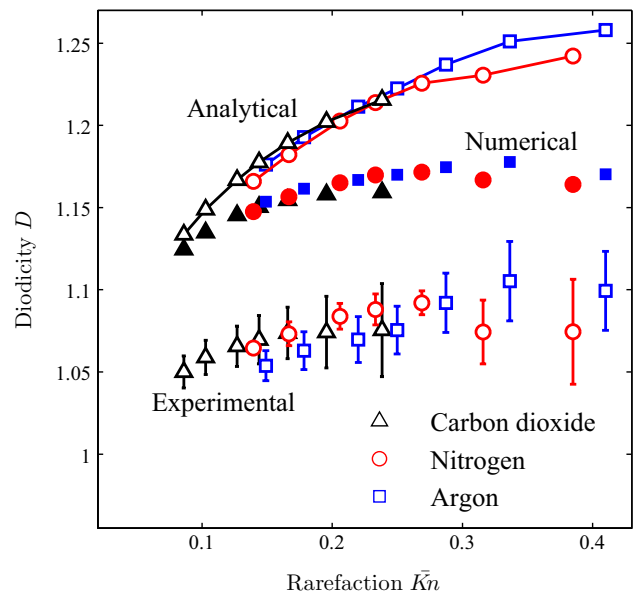Accordingly, Fig. 5 appears slightly different.

Fig. 5 Diodicity versus mean Knudsen number. Analytical data (*interconnected with lines*), numerical data (*filled symbols*) and experimental data (*open symbols*) are prepared according to Eqs. (11) and (23) with values stated in Tables 2, 3, 4, 5, 6 and 7 in "Appendix". The experimental uncertainty of D is expressed by *vertical errorbars* that are calculated according to Eq. (30). The *horizontal errorbars* are not shown but the experimental uncertainty of $\bar{Kn}$ according to Eq. (31) is tabulated. All depicted values are provided in Tables 8, 9 and 10 in the "Appendix"