

– **Valori sperimentali dell'energia per strato e delle masse atomiche**

Per il calcolo delle caratteristiche orbitali dei protoni nucleari si possono utilizzare anche le relazioni :

$$\begin{aligned}
 V_{ZPP} &= \left( \frac{8 \cdot E_{1P_s}}{3 \cdot m_p} \cdot \frac{17,2016 \text{ MeV}}{17,792 \text{ MeV}} \right)^{\frac{1}{2}} = \\
 &= \left( \frac{8}{6 \cdot m_p} \cdot \frac{17,2016 \text{ MeV}}{17,792 \text{ MeV}} \cdot \frac{E_0(N)}{p_s^2} \right)^{\frac{1}{2}} \\
 R_{ZPP} &= \frac{N \cdot \frac{K_p^2}{2}}{V_{ZPP}^2} = \\
 &= \left( \frac{3}{8} \cdot \frac{17,792 \text{ MeV}}{17,2016 \text{ MeV}} \cdot K_p^2 \cdot m_p \right) \cdot \frac{N}{E_0(N)} \cdot p_s^2
 \end{aligned}$$

con le quali viene considerato anche l'adattamento dell'energia di legame al valore assunto nel deutone.

Essendo conosciuti, con ottima precisione, i valori sperimentali della massa atomica degli elementi e la loro **abbondanza isotopica** relativa, è possibile calcolare la massa dei diversi isotopi con la relazione :

$$m_A(Z) = \frac{m(Z) \cdot 100}{\%A + \sum_i (\%A_i) \cdot \frac{A_i}{A}}$$

Ipotizzando l'assenza di lacune di protoni sulle orbite, l'energia per strato, per

ciascun isotopo, si potrà derivare dai valori sperimentali, con la relazione :

$$E_0(A; Z) =$$

$$= \left[ Z \cdot 1.007825067 + N \cdot 1.00866489 - m_A(A; Z) \right] \cdot \frac{931.4943336 \text{ MeV}}{\left( (P_s - 1) + \frac{n_p}{2 \cdot P_s^2} \right)}$$

I valori forniti da queste relazioni sono riportati come risultati sperimentali alle pagine 627 e seg..

**valori sperimentali delle masse atomiche e dell'energia nucleare  
per strato  $E_0(N)$**

Sa	abb. %	$E_0(N)$ MeV	$E_{ZN}$ MeV	$m(A; Z)$	$m(Z)$
$D_1^2$		17.792	2.224	2.014102	2.014102
$He_2^3$	0,000137	20.830471	20.830471	3.0019526	4.002602
$He_2^4$	99,99986	28.295551	28.295551	4.0026034	
$Li_3^6$	7,42	29.914192	33.653466	6.0133414	6.9412
$Li_3^7$	92,58	35.247548	39.653491	7.0155650	
$Be_4^9$		46.531807	58.164759	9.0121823	
$B_5^{10}$	19,9	49.144818	67.574125	10.009906	10.8117
$B_5^{11}$	80,1	54.343498	74.722310	11.010897	
$C_6^{12}$	98,892	61.397736	92.096604	12.000070	12.01115
$C_6^{13}$	1,108	66.774874	100.16231	13.000076	
$N_7^{14}$	99,635	64.408218	104.66335	14.003069	14.00672
$N_7^{15}$	0,365	69.249633	112.53065	15.003288	
$O_8^{16}$	99,762	72.852787	127.49238	15.995051	15.99943
$O_8^{17}$	0,038	77.629432	135.85151	16.994742	

Sa	abb.%	$E_0(N)$ MeV	$E_{Zn}$ MeV	$m(A; Z)$	$m(Z)$
$O_8^{18}$	0,20	82. 406 076	144. 210 63	17. 994 433	
$F_9^{19}$		78. 827 523	147. 801 61	18. 998 403	
$Ne_{10}^{20}$	90,48	80. 465 075	160. 930 15	19. 992 134	20. 179 76
$Ne_{10}^{21}$	0,27	84. 683 761	169. 367 52	20. 991 741	
$Ne_{10}^{22}$	9,25	88. 902 914	177. 805 83	21. 991 347	
$Na_{11}^{23}$		90. 761 094	186. 564 47	22. 989 769	
$Mg_{12}^{24}$	78,99	93. 903 667	198. 241 07	23. 985 059	24,30506
$Mg_{12}^{25}$	10,0	98. 001 360	206. 891 76	24. 984 437	
$Mg_{12}^{26}$	11,01	102. 099 49	215. 543 38	25. 983 814	
$Al_{13}^{27}$		103. 823 96	224. 951 91	26. 981 54	
$Si_{14}^{28}$	92,23	106. 444 40	236. 543 11	27. 976 92	28. 085 53
$Si_{14}^{29}$	4,67	110. 422 30	245. 382 89	28. 976 10	
$Si_{14}^{30}$	3,1	114. 399 78	254. 221 74	29. 975 27	
$P_{15}^{31}$		115. 426 70	262. 916 37	30. 973 76	

Sa	abb.%	$E_0(N)$ MeV	$E_{Zn}$ MeV	$m(A; Z)$	$m(Z)$
$S_{16}^{32}$	95,02	116. 07536	270. 84251	31. 97308	32. 06550
$S_{16}^{33}$	0,75	119. 87023	279. 69720	32. 97224	
$S_{16}^{34}$	4,21	123. 66549	288. 55281	33. 97139	
$S_{16}^{36}$	0,02	131. 25522	306. 26218	35. 96971	
$Cl_{17}^{35}$	75,59	126. 14679	301. 35067	34. 96548	35. 4532
$Cl_{17}^{37}$	24,41	133. 67310	319. 33017	36. 96351	
$Ar_{18}^{36}$	0,337	125. 85661	307. 64950	35. 96654	39. 9481
$Ar_{18}^{38}$	0,063	133. 16880	325. 52374	37. 96468	
$Ar_{18}^{40}$	99,6	140. 48099	343. 39798	39. 96283	
$K_{19}^{39}$	93,2581	133. 48689	333. 71723	38. 96371	39. 09831
$K_{19}^{40}$	0,0117	137. 06193	342. 65481	39. 96278	
$K_{19}^{41}$	6,7302	140. 63696	351. 59240	40. 96185	
$Ca_{20}^{40}$	96,943	133. 68399	341. 63686	39. 96304	40. 0784
$Ca_{20}^{42}$	0,647	140. 67425	359. 50085	41. 96119	
$Ca_{20}^{43}$	0,135	144. 16974	368. 43378	42. 96026	
$Ca_{20}^{44}$	2,086	147. 66487	377. 36577	43. 95934	
$Ca_{20}^{46}$	0,004	154. 65513	395. 22977	45. 95749	
$Ca_{20}^{48}$	0,185	161. 64538	413. 09376	47. 95564	

Sa	abb.%	$E_0(N)$ MeV	$E_{Zn}$ MeV	$m(A; Z)$	$m(Z)$
$Sc_{21}^{45}$		148. 537 51	387. 847 94	44. 955 91	
$Ti_{22}^{46}$	8,0	153. 862 78	410. 300 74	45. 939 63	47. 867 10
$Ti_{22}^{47}$	7,3	157. 348 16	419. 595 09	46. 938 32	
$Ti_{22}^{48}$	73,8	160. 833 19	428. 888 51	47. 937 01	
$Ti_{22}^{49}$	5,5	164. 318 22	438. 181 92	48. 935 69	
$Ti_{22}^{50}$	5,4	167. 803 60	447. 476 27	49. 934 38	
$V_{23}^{50}$	0,25	160. 422 80	436. 706 50	49. 945 10	50. 941 51
$V_{23}^{51}$	99,75	163. 763 48	445. 800 58	50. 944 01	
$Cr_{24}^{50}$	4,345	157. 608 76	437. 802 10	49. 943 09	51. 996 16
$Cr_{24}^{52}$	83,789	164. 183 32	456. 064 78	51. 940 81	
$Cr_{24}^{53}$	9,501	167. 470 60	465. 196 11	52. 939 68	
$Cr_{24}^{54}$	2,365	170. 757 88	474. 327 45	53. 938 53	
$Mn_{25}^{55}$		170. 142 39	482. 070 09	54. 938 05	
$Fe_{26}^{54}$	5,84	164. 104 29	474. 079 07	53. 937 12	55. 845 2
$Fe_{26}^{56}$	91,72	170. 442 75	492. 390 18	55. 934 79	
$Fe_{26}^{57}$	2,17	173. 612 31	501. 546 67	56. 933 63	
$Fe_{26}^{58}$	0,27	176. 781 54	510. 702 22	57. 932 47	

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Sa	abb.%	$E_0(N)$ MeV	$E_{Zn}$ MeV	$m(A; Z)$	$m(Z)$
$Co_{27}^{59}$		175. 69124	517. 31310	58. 93320	
$Ni_{28}^{58}$	68,177	170. 24505	510. 73515	57. 93075	58. 69342
$Ni_{28}^{60}$	26,133	176. 36738	529. 10215	59. 92836	
$Ni_{28}^{61}$	1,14	179. 42855	538. 28565	60. 92717	
$Ni_{28}^{62}$	3,634	182. 48972	547. 46915	61. 92598	
$Ni_{28}^{64}$	0,926	188. 61205	565. 83615	63. 92359	
$Cu_{29}^{63}$	69,14	181. 84158	551. 20730	62. 92979	63. 5463
$Cu_{29}^{65}$	30,86	187. 85194	569. 42620	64. 92756	
$Zn_{30}^{64}$	48,6	181. 16714	554. 82436	63. 93373	65. 4094
$Zn_{30}^{66}$	27,81	187. 06811	572. 89608	65. 93166	
$Zn_{30}^{67}$	4,1	190. 01874	581. 93240	66. 93062	
$Zn_{30}^{68}$	18,57	192. 96907	590. 96779	67. 92959	
$Zn_{30}^{70}$	0,92	198. 87004	609. 03951	69. 92752	
$Ga_{31}^{69}$	60,3	193. 27989	597. 95965	68. 92991	69. 7231
$Ga_{31}^{71}$	39,7	199. 10951	615. 99504	70. 92787	
$Ge_{32}^{70}$	20,4	193. 36122	604. 25382	69. 93097	72. 641
$Ge_{32}^{72}$	27,45	199. 11466	622. 23332	71. 92900	

Sa	abb.%	$E_0(N)$ MeV	$E_{Zn}$ MeV	$m(A; Z)$	$m(Z)$
$Ge_{32}^{73}$	7,73	201. 99138	631. 22307	72. 92802	
$Ge_{32}^{74}$	36,67	204. 86810	640. 21282	73. 92703	
$Ge_{32}^{76}$	7,75	210. 62184	658. 19325	75. 92506	
$As_{33}^{75}$		206. 75134	652. 55891	74. 92160	
$Se_{34}^{74}$	0,89	200. 73195	639. 83310	73. 92576	78.963
$Se_{34}^{76}$	9,36	206. 38281	657. 84520	75. 92375	
$Se_{34}^{77}$	7,63	209. 20809	666. 85078	76. 92275	
$Se_{34}^{78}$	23,78	212. 03337	675. 85637	77. 92175	
$Se_{34}^{80}$	49,61	217. 68423	693. 86847	79. 91974	
$Se_{34}^{82}$	8,73	223. 33479	711. 87964	81. 91773	
$Br_{35}^{79}$	50,7	213. 00219	685. 60079	78. 91911	79.9041
$Br_{35}^{81}$	49,3	218. 61005	703. 65109	80. 91706	
$Kr_{36}^{78}$	0,42	207. 72576	675. 10871	77. 92087	83.7982
$Kr_{36}^{80}$	2,27	213. 27425	693. 14130	79. 91884	
$Kr_{36}^{82}$	11,56	218. 82274	711. 17390	81. 91681	
$Kr_{36}^{83}$	11,55	221. 59713	720. 19066	82. 91579	
$Kr_{36}^{84}$	56,90	224. 37123	729. 20649	83. 91478	
$Kr_{36}^{86}$	17,30	229. 91972	747. 23908	85. 91275	



Sa	abb. %	$E_0(N)$ MeV	$E_{Zn}$ MeV	$m(A; Z)$	$m(Z)$
$Rb_{37}^{85}$	72,168	225. 311 40	739. 303 02	84. 911 77	85. 467 83
$Rb_{37}^{87}$	27, 832	230. 820 39	757. 379 39	86. 909 69	
$Sr_{38}^{84}$	0, 56	219. 831 67	728. 192 42	83. 914 19	87. 621
$Sr_{38}^{86}$	9, 84	225. 279 69	746. 238 99	85. 912 15	
$Sr_{38}^{87}$	7, 02	228. 003 42	755. 261 34	86. 911 13	
$Sr_{38}^{88}$	82, 58	230. 727 43	764. 284 62	87. 910 10	
$Y_{39}^{89}$		231. 935 50	775. 534 34	88. 905 85	
$Zr_{40}^{90}$	51, 59	229. 847 31	775. 734 68	89. 913 46	91. 224 2
$Zr_{40}^{91}$	11, 22	234. 099 79	784. 702 07	90. 912 50	
$Zr_{40}^{92}$	17, 15	235. 161 32	793. 669 46	91. 911 54	
$Zr_{40}^{94}$	17, 28	240. 475 06	811. 603 32	93. 909 61	
$Zr_{40}^{96}$	2, 76	245. 788 79	829. 537 17	95. 907 69	
$Nb_{41}^{93}$		236. 553 76	805. 761 25	92. 906 38	
$Mo_{42}^{92}$	14, 84	228. 915 46	786. 896 90	91. 917 13	95. 942
$Mo_{42}^{94}$	9, 25	232. 504 32	804. 718 04	93. 915 33	
$Mo_{42}^{95}$	15, 92	236. 691 96	813. 628 61	94. 914 42	
$Mo_{42}^{96}$	16, 68	239. 283 86	822. 538 26	95. 913 53	

Sa	abb.%	$E_0(N)$ MeV	$E_{Zn}$ MeV	$m(A; Z)$	$m(Z)$
$Mo_{42}^{97}$	9,45	241. 87602	831. 44883	96. 91262	
$Mo_{42}^{98}$	24,13	244. 46819	840. 35940	97. 91172	
$Mo_{42}^{100}$	9,73	249. 65225	858. 17961	99. 90992	
$Tc_{43}^{99}$		245. 82366	852. 70083	98. 90630	
$Ru_{44}^{96}$	5,50	235. 18854	823. 15989	95. 91118	101.072
$Ru_{44}^{98}$	1,88	240. 29307	841. 02575	97. 90933	
$Ru_{44}^{99}$	12,7	242. 84534	849. 95868	98. 90840	
$Ru_{44}^{100}$	12,6	245. 39787	858. 89254	99. 90748	
$Ru_{44}^{101}$	17,02	247. 95093	867. 82826	100. 90655	
$Ru_{44}^{102}$	31,6	250. 50187	876. 75653	101. 90563	
$Ru_{44}^{104}$	18,7	255. 60640	894. 62239	103. 90378	
$Rh_{45}^{103}$		250. 38347	884. 16663	102. 90550	
$Pd_{46}^{102}$	0,99	246. 70596	878. 88998	101. 90166	106.421
$Pd_{46}^{104}$	10,97	251. 74185	896. 83036	103. 89973	
$Pd_{46}^{105}$	22,23	254. 25849	905. 79589	104. 89877	
$Pd_{46}^{106}$	27,33	256. 77775	914. 77073	105. 89780	
$Pd_{46}^{108}$	26,71	261. 81103	932. 70179	107. 89588	
$Pd_{46}^{110}$	11,77	266. 84692	950. 64217	109. 89395	

Sa	abb.%	$E_0(N)$ MeV	$E_{Zn}$ MeV	$m(A; Z)$	$m(Z)$
$Ag_{47}^{107}$	51,33	257.09932	923.95067	106.89577	107.86822
$Ag_{47}^{109}$	48,67	262.09661	941.90968	108.89382	
$Cd_{48}^{106}$	1,21	251.63114	912.16288	105.89892	112.4118
$Cd_{48}^{108}$	0,89	256.57507	930.08462	107.89701	
$Cd_{48}^{110}$	12,39	261.51900	948.00637	109.89510	
$Cd_{48}^{111}$	12,75	263.98968	956.96259	110.89415	
$Cd_{48}^{112}$	24,07	266.46036	965.91880	111.89320	
$Cd_{48}^{113}$	12,26	268.93361	974.88433	112.89224	
$Cd_{48}^{114}$	28,86	271.40429	983.84055	113.89129	
$Cd_{48}^{116}$	7,57	276.34822	1001.7623	115.88938	
$In_{49}^{113}$	4,23	263.29252	962.66329	112.90452	114.8183
$In_{49}^{115}$	95,77	268.13815	980.38011	114.90283	
$Sn_{50}^{112}$	0,95	258.75878	954.17299	111.90413	118.7107
$Sn_{50}^{114}$	0,65	263.56839	971.90844	113.90242	
$Sn_{50}^{115}$	0,34	265.97446	980.78082	114.90156	
$Sn_{50}^{116}$	14,54	268.37800	989.64388	115.90071	
$Sn_{50}^{117}$	7,59	270.78407	998.51626	116.89985	
$Sn_{50}^{118}$	24,23	273.18761	1007.3793	117.89900	
$Sn_{50}^{119}$	8,59	275.59368	1016.2517	118.89814	

Sa	abb.%	$E_0(N)$ MeV	$E_{ZN}$ MeV	$m(A; Z)$	$m(Z)$
$^{120}_{50}\text{Sn}$	32,69	277.99975	1025.1241	119.89728	
$^{122}_{50}\text{Sn}$	4,63	282.80937	1042.8595	121.89557	
$^{124}_{50}\text{Sn}$	5,79	287.61898	1060.5950	123.89386	
$^{121}_{51}\text{Sb}$	57,25	275.49707	1024.5047	120.90577	121.7601
$^{123}_{51}\text{Sb}$	42,75	280.22869	1042.1004	122.90421	
$^{120}_{52}\text{Te}$	0,09	268.72146	1007.7055	119.91430	127.603
$^{122}_{52}\text{Te}$	2,51	273.38136	1025.1801	121.91287	
$^{123}_{52}\text{Te}$	0,90	275.71255	1033.9221	122.91215	
$^{124}_{52}\text{Te}$	4,65	278.04126	1042.6547	123.91144	
$^{125}_{52}\text{Te}$	7,2	280.37246	1051.3967	124.91072	
$^{126}_{52}\text{Te}$	18,95	282.70116	1060.1294	125.91001	
$^{128}_{52}\text{Te}$	31,8	287.36106	1077.6040	127.90858	
$^{130}_{52}\text{Te}$	33,9	292.02097	1095.0786	129.90715	
$^{127}_{53}\text{I}$		283.65722	1072.5788	126.90447	
$^{124}_{54}\text{Xe}$	0,11	272.65014	1039.4787	123.91317	131.2936
$^{126}_{54}\text{Xe}$	0,09	277.22632	1056.9254	125.91177	
$^{128}_{54}\text{Xe}$	1,92	281.80250	1074.3720	127.91037	
$^{129}_{54}\text{Xe}$	26,44	284.09059	1083.0954	128.90967	

Sa	abb.%	$E_0(N)$ MeV	$E_{ZN}$ MeV	$m(A; Z)$	$m(Z)$
$Xe_{54}^{130}$	4,08	286.37868	1091.8187	129.90897	
$Xe_{54}^{131}$	21,18	288.66677	1100.5421	130.90827	
$Xe_{54}^{132}$	26,89	290.95486	1109.2654	131.90757	
$Xe_{54}^{134}$	10,42	295.53104	1126.7121	133.90617	
$Xe_{54}^{136}$	8,87	300.10722	1144.1588	135.90477	
$Cs_{55}^{133}$		290.99900	1118.5274	132.905452	
$Ba_{56}^{130}$	0,106	279.63234	1083.5753	129.91614	137.3277
$Ba_{56}^{132}$	0,101	284.10827	1100.9195	131.91485	
$Ba_{56}^{134}$	2,417	288.58420	1118.2638	133.91356	
$Ba_{56}^{135}$	6,592	290.82096	1126.9312	134.91292	
$Ba_{56}^{136}$	7,854	293.06013	1135.6080	135.91227	
$Ba_{56}^{137}$	11,76	295.29689	1144.2754	136.91163	
$Ba_{56}^{138}$	71,17	297.53605	1152.9522	137.91098	
$La_{57}^{138}$	0,09	295.89266	1155.8307	137.90705	138.90548
$La_{57}^{139}$	99,91	298.11868	1164.5261	138.90638	
$Ce_{58}^{136}$	0,20	288.43685	1135.7201	135.91047	140.1161
$Ce_{58}^{138}$	0,25	292.84883	1153.0923	137.90915	
$Ce_{58}^{140}$	88,48	297.25844	1170.4551	139.90784	

Sa	abb.%	$E_0(N)$ MeV	$E_{ZN}$ MeV	$m(A; Z)$	$m(Z)$
$Ce_{58}^{142}$	11,07	301. 67042	1187. 8273	141. 90652	
$Pr_{59}^{141}$		296. 79855	1177. 9192	140. 90765	
$Nd_{60}^{142}$	27,13	295. 16377	1180. 6551	141. 91254	144. 2423
$Nd_{60}^{143}$	12,18	297. 32598	1189. 3039	142. 91192	
$Nd_{60}^{144}$	23,8	299. 48819	1197. 9527	143. 91130	
$Nd_{60}^{145}$	8,3	301. 64806	1206. 5922	144. 91069	
$Nd_{60}^{146}$	17,19	303. 81027	1215. 2411	145. 91007	
$Nd_{60}^{148}$	5,76	308. 13235	1232. 5294	147. 90884	
$Nd_{60}^{150}$	5,64	312. 45443	1249. 8177	149. 90761	
$Pm_{61}^{147}$		302. 94643	1217. 8447	146. 91510	
$Sm_{62}^{144}$	3,07	294. 20122	1188. 5729	143. 91969	150. 362
$Sm_{62}^{147}$	15,02	300. 5798	1214. 3424	146. 91802	
$Sm_{62}^{148}$	11,25	302. 70677	1222. 9353	147. 91746	
$Sm_{62}^{149}$	13,83	304. 83142	1231. 5190	148. 91691	
$Sm_{62}^{150}$	7,43	306. 95839	1240. 1119	149. 91635	
$Sm_{62}^{152}$	26,6	311. 21232	1257. 2978	151. 91523	
$Sm_{62}^{154}$	22,8	315. 46394	1274. 4743	153. 91412	

Sa	abb.%	$E_0(N)$ MeV	$E_{zN}$ MeV	$m(A; Z)$	$m(Z)$
$Eu_{63}^{151}$	47,8	306. 255 04	1243. 395 5	150. 920 65	151. 9641
$Eu_{63}^{153}$	52,2	310. 471 95	1260. 516 1	152. 919 60	
$Gd_{64}^{152}$	0,20	304. 990 10	1244. 359 6	151. 927 44	157. 253
$Gd_{64}^{154}$	2,18	309. 163 51	1261. 387 1	153. 926 49	
$Gd_{64}^{155}$	14,80	311. 251 36	1269. 905 6	154. 926 01	
$Gd_{64}^{156}$	20,47	313. 339 21	1278. 424 0	155. 925 53	
$Gd_{64}^{157}$	15,65	315. 424 77	1286. 933 1	156. 925 06	
$Gd_{64}^{158}$	24,84	317. 512 62	1295. 451 5	157. 924 58	
$Gd_{64}^{160}$	21,86	321. 688 31	1312. 488 3	159. 923 62	
$Tb_{65}^{159}$		317. 566 64	1302. 023 2	158. 925 35	
$Dy_{66}^{156}$	0,06	308. 137 99	1269. 528 5	155. 933 40	162. 5001
$Dy_{66}^{158}$	0,10	312. 248 27	1286. 462 9	157. 932 55	
$Dy_{66}^{160}$	2,34	316. 358 56	1303. 397 2	159. 931 70	
$Dy_{66}^{161}$	18,89	318. 414 83	1311. 869 1	160. 931 27	
$Dy_{66}^{162}$	25,51	320. 471 10	1320. 340 9	161. 930 84	
$Dy_{66}^{163}$	24,92	322. 525 11	1328. 803 4	162. 930 42	
$Dy_{66}^{164}$	28,18	324. 581 38	1337. 275 3	163. 929 99	

Sa	abb.%	$E_0(N)$ MeV	$E_{ZN}$ MeV	$m(A; Z)$	$m(Z)$
$\text{Ho}_{67}^{165}$		324. 699 73	1344. 256 9	164. 930 32	
$\text{Er}_{68}^{162}$	0,14	315. 488 67	1312. 432 9	161. 937 65	167. 259 3
$\text{Er}_{68}^{164}$	1,61	319. 541 52	1329. 292 7	163. 936 88	
$\text{Er}_{68}^{166}$	33,6	323. 594 36	1346. 152 6	165. 936 11	
$\text{Er}_{68}^{167}$	22,95	325. 621 91	1354. 587 1	166. 935 72	
$\text{Er}_{68}^{168}$	26,8	327. 647 21	1363. 012 4	167. 935 34	
$\text{Er}_{68}^{170}$	14,9	331. 700 06	1379. 872 2	169. 934 57	
$\text{Tu}_{69}^{169}$		328. 075 12	1371. 354 0	168. 934 21	
$\text{Yb}_{70}^{168}$	0,12	321. 825 51	1351. 667 1	167. 945 84	173. 04 3
$\text{Yb}_{70}^{170}$	3,03	325. 810 92	1368. 405 9	169. 945 20	
$\text{Yb}_{70}^{171}$	14,31	327. 803 63	1376. 775 2	170. 944 88	
$\text{Yb}_{70}^{172}$	21,84	329. 798 56	1385. 153 9	171. 944 55	
$\text{Yb}_{70}^{173}$	16,13	331. 791 26	1393. 523 3	172. 944 23	
$\text{Yb}_{70}^{174}$	31,84	333. 783 97	1401. 892 7	173. 943 91	
$\text{Yb}_{70}^{176}$	12,73	337. 771 61	1418. 640 7	175. 943 26	
$\text{Lu}_{71}^{175}$	97,41	334. 525 29	1411. 696 7	174. 941 21	174. 96 71
$\text{Lu}_{71}^{176}$	2,59	336. 512 97	1420. 084 7	175. 940 87	



Sa	abb.%	$E_0(N)$ MeV	$E_{ZN}$ MeV	$m(A; Z)$	$m(Z)$
$\text{Hf}_{72}^{174}$	0,162	328. 57004	1393. 1370	173. 95163	178. 492
$\text{Hf}_{72}^{176}$	5,206	332. 49809	1409. 7919	175. 95108	
$\text{Hf}_{72}^{177}$	18,606	334. 46321	1418. 1240	176. 95080	
$\text{Hf}_{72}^{178}$	27,297	336. 42833	1426. 4561	177. 95052	
$\text{Hf}_{72}^{179}$	13,629	338. 39345	1434. 7882	178. 95024	
$\text{Hf}_{72}^{180}$	35,1	340. 35857	1443. 1203	179. 94996	
$\text{Ta}_{73}^{180}$	0,0123	338. 93561	1443. 8657	179. 94832	180. 94791
$\text{Ta}_{73}^{181}$	99,9877	340. 89369	1452. 2071	180. 94803	
$\text{W}_{74}^{180}$	0,12	336. 50957	1440. 2610	179. 95135	183. 841
$\text{W}_{74}^{182}$	26,50	340. 39873	1456. 9066	181. 95081	
$\text{W}_{74}^{183}$	14,31	342. 34331	1465. 2294	182. 95054	
$\text{W}_{74}^{184}$	30,64	344. 28789	1473. 5522	183. 95027	
$\text{W}_{74}^{186}$	28,43	348. 17705	1490. 1978	185. 94973	
$\text{Re}_{75}^{185}$	37,37	343. 39819	1476. 6122	184. 95481	186. 2071
$\text{Re}_{75}^{187}$	62,63	347. 25842	1493. 2112	186. 95432	
$\text{Os}_{76}^{184}$	0,02	339. 04307	1464. 6661	183. 95813	190. 233
$\text{Os}_{76}^{186}$	1,59	342. 87897	1481. 2371	185. 95767	
$\text{Os}_{76}^{187}$	1,64	344. 79476	1489. 5134	186. 95745	

Sa	abb.%	$E_0(N)$ MeV	$E_{ZN}$ MeV	$m(A; Z)$	$m(Z)$
$Os_{76}^{188}$	13,32	346.71271	1497.7989	187.95722	
$Os_{76}^{189}$	16,13	348.63066	1506.0844	188.95699	
$Os_{76}^{190}$	26,40	350.54861	1514.3700	189.95676	
$Os_{76}^{192}$	40,90	354.38235	1530.9317	191.95631	
$Ir_{77}^{191}$	37,23	349.45581	1516.6382	190.96215	192.2173
$Ir_{77}^{193}$	62,77	353.26116	1533.1534	192.96175	
$Pt_{78}^{190}$	0,01	344.41424	1501.6461	189.96874	195.0849
$Pt_{78}^{192}$	0,77	348.18717	1518.0961	191.96841	
$Pt_{78}^{194}$	32,9	351.96011	1534.5461	193.96808	
$Pt_{78}^{195}$	33,8	353.84550	1542.7664	194.96792	
$Pt_{78}^{196}$	25,3	355.73304	1550.9960	195.96775	
$Pt_{78}^{198}$	7,22	359.50383	1567.4367	197.96743	
$Au_{79}^{197}$		356.02401	1559.3851	196.966569	
$Hg_{80}^{196}$	0,14	353.21685	1554.1541	195.96268	200.592
$Hg_{80}^{198}$	9,96	356.96607	1570.6507	197.96230	
$Hg_{80}^{199}$	16,84	358.84068	1578.8990	198.96211	
$Hg_{80}^{200}$	23,13	360.71529	1587.1473	199.96192	
$Hg_{80}^{201}$	13,22	362.58990	1595.3955	200.96173	

Sa	abb. %	$E_0(N)$ MeV	$E_{ZN}$ MeV	$m(A; Z)$	$m(Z)$
$Hg_{80}^{202}$	29,86	364.46450	1603.6438	201.96154	
$Hg_{80}^{204}$	6,85	368.21372	1620.1404	203.96116	
$Tl_{81}^{203}$	29,5	361.94393	1599.7922	202.97350	204.38332
$Tl_{81}^{205}$	70,5	365.65089	1616.1769	204.97324	
$Pb_{82}^{204}$	1,40	362.79860	1610.8258	203.96948	207.21
$Pb_{82}^{206}$	24,1	366.49516	1627.2385	205.96919	
$Pb_{82}^{207}$	22,1	368.34448	1635.4495	206.96904	
$Pb_{82}^{208}$	52,4	370.19381	1643.6605	207.96889	
$Bi_{83}^{209}$		367.76413	1640.2280	208.9804	
$Po_{84}^{209}$		365.53187	1637.5828	208.9824	
$At_{85}^{210}$		364.55416	1640.4937	209.9871	
$Rn_{86}^{222}$		377.91071	1708.1564	222.0176	
$Fr_{87}^{223}$		377.42055	1713.4893	223.0197	
$Ra_{88}^{226}$		379.73934	1731.6114	226.0254	

Sa	abb.%	$E_0(N)$ MeV	$E_{ZN}$ MeV	$m(A; Z)$	$m(Z)$
$Ac_{89}^{227}$		379. 18445	1736. 6648	227. 0278	
$Th_{90}^{232}$		384. 06127	1766. 6818	232. 03806	
$Pa_{91}^{231}$		380. 92184	1759. 8589	231. 03588	
$U_{92}^{234}$	0,006	381. 51529	1770. 2310	234. 04990	238. 02891
$U_{92}^{235}$	0,72	383. 21063	1778. 0973	235. 05012	
$U_{92}^{238}$	99,274	388. 30066	1801. 7151	238. 05076	
$Np_{93}^{237}$		385. 24595	1795. 2461	237. 0482	
$Pu_{94}^{244}$		392. 32029	1836. 0590	244. 0642	
$Am_{95}^{243}$		389. 32204	1829. 8136	243. 0614	
$Cm_{96}^{247}$		392. 59029	1853. 0262	247. 0703	
$Bk_{97}^{247}$		390. 76875	1852. 2439	247. 0703	
$Cf_{98}^{251}$		393. 92518	1875. 0839	251. 0796	
$Es_{99}^{252}$		393. 15878	1879. 2989	252. 0829	

Sa	abb.%	$E_0(N)$ MeV	$E_{zN}$ MeV	$m(A; Z)$	$m(Z)$
$Fm_{100}^{257}$		<b>397. 397 69</b>	<b>1907. 508 9</b>	<b>257. 0951</b>	
$Md_{101}^{258}$		<b>396. 584 58</b>	<b>1911. 537 7</b>	<b>258. 0986</b>	
$No_{102}^{259}$		<b>396. 009 14</b>	<b>1916. 684 3</b>	<b>259. 1009</b>	
$Lw_{103}^{260}$		<b>395. 035 94</b>	<b>1919. 874 7</b>	<b>260. 1053</b>	
$Rt_{104}^{261}$		<b>394. 261 60</b>	<b>1923. 996 6</b>	<b>261. 1087</b>	
$Db_{105}^{262}$		<b>393. 170 41</b>	<b>1926. 535 0</b>	<b>262. 1138</b>	
$Sg_{106}^{263}$		<b>392. 220 61</b>	<b>1929. 725 4</b>	<b>263. 1182</b>	
$Bh_{107}^{262}$		<b>387. 954 21</b>	<b>1916. 493 8</b>	<b>262. 1229</b>	
$Hs_{108}^{265}$					<b>265</b>
$Mt_{109}^{266}$					<b>266</b>
$Ds_{110}^{267}$					<b>269</b>
$Rg_{111}^{272}$					<b>272</b>