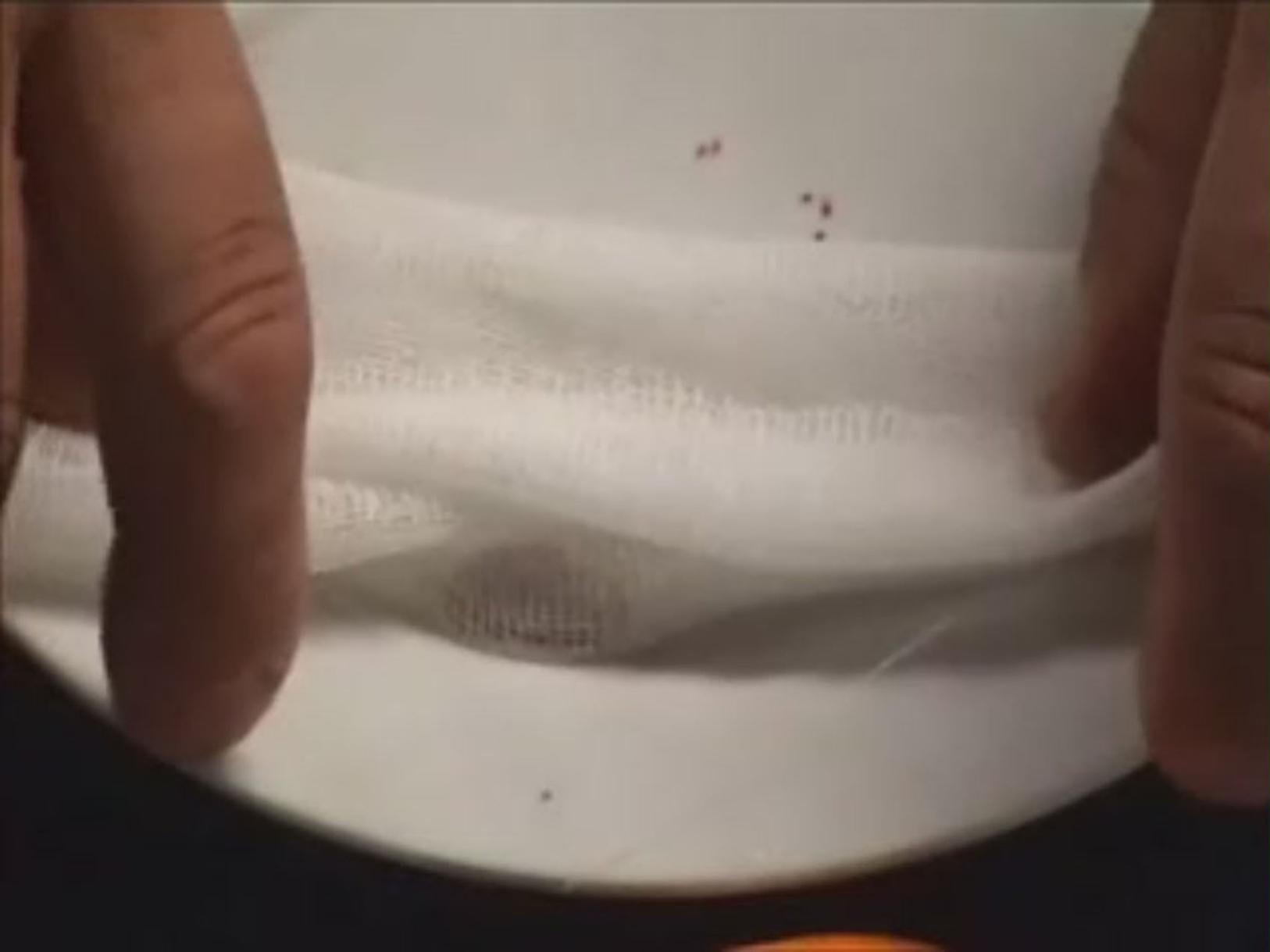
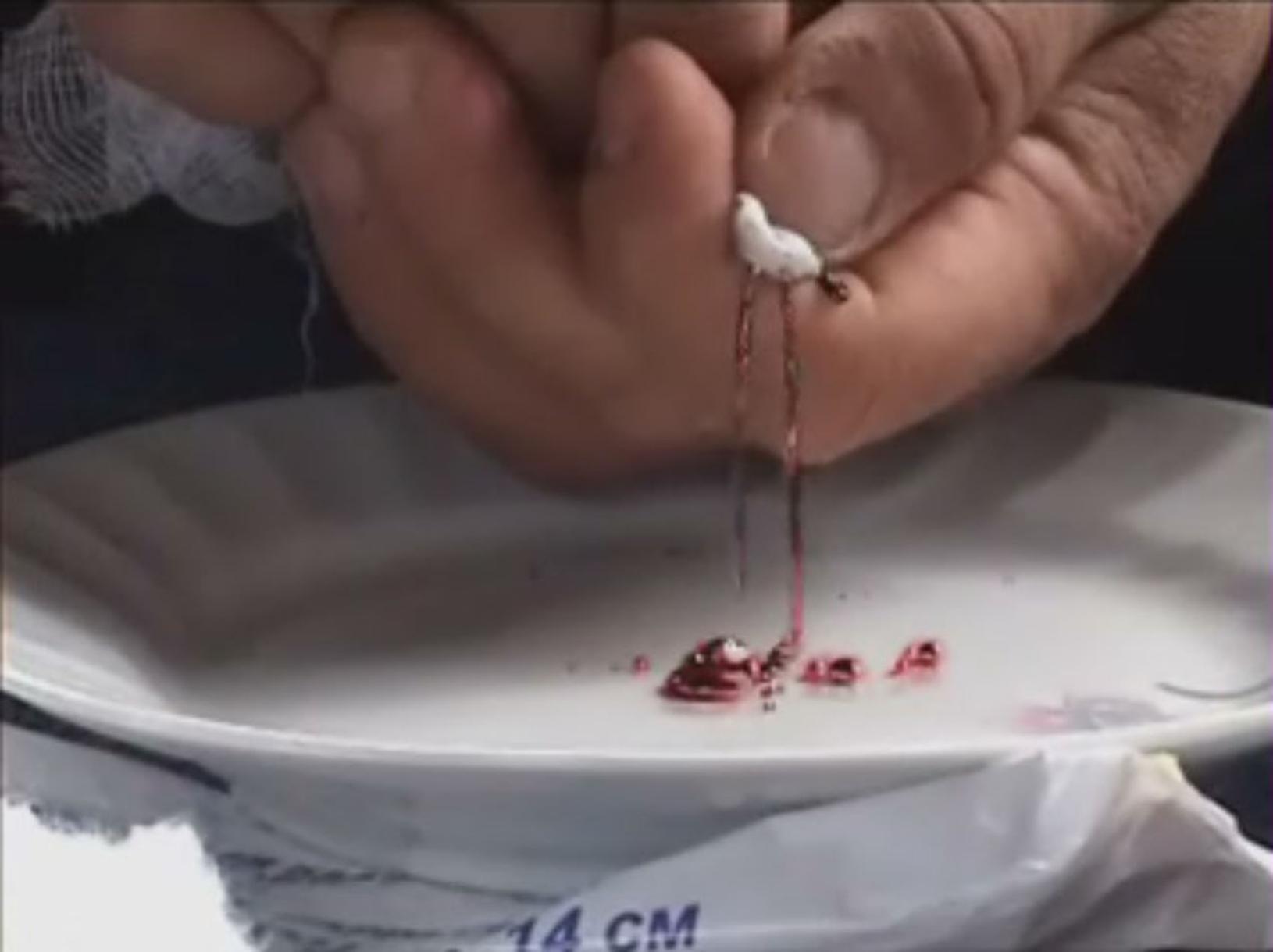




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14 CM



# Физико-химическая таблица изостеров

E+3B (исходные ионные)  
E+2B (исходные полевые)

15 P	33 As	51 Sb	69 Tm	75 Pt	87 Fr	96 Cm	105 (Ns)	114 Mx
16 S	34 Se	52 Te	70 Ru	76 Os	88 Rn	97 (Cs)	106 (Ku)	115 (Lr)
17 Cl	35 Br	53 I	71 Rh	77 Ir	89 At	98 (Fr)	107 (Rg)	116 (Wg)
18 Ar	36 Kr	54 Cs	72 Os	78 Pt	90 Th	99 Cf	108 (Nh)	117 (Nh)
19 K	37 Rb	55 Ba	73 Hg	79 Pb	91 Pa	100 Ac	109 (Nh)	118 (Nh)
20 Ca	38 Sr	56 Ra	74 Tl	80 Bi	92 U	101 Md	108 (Nh)	119 (Nh)
21 Sc	39 Y	57 La	75 W	81 Po	93 Np	102 (No)	107 (Nh)	120 (Nh)
22 Ti	40 Zr	58 Ce	76 Re	82 At	94 Pu	103 (Nh)	106 (Nh)	121 (Nh)
23 V	41 Nb	59 Pr	77 Os	83 Fr	95 Am	104 (Bg)	105 (Nh)	122 (Nh)
24 Cr	42 Mo	60 Nd	78 Pt	84 Fr	96 Cm	105 (Nh)	106 (Nh)	123 (Nh)
25 Mn	43 Tc	61 Pm	79 Au	85 At	97 (Cs)	106 (Nh)	107 (Nh)	124 (Nh)
26 Fe	44 Ru	62 Sm	80 Tl	86 Rn	98 (Fr)	107 (Nh)	108 (Nh)	125 (Nh)
27 Co	45 Rh	63 Eu	81 Hg	87 At	99 Th	108 (Nh)	109 (Nh)	126 (Nh)
28 Ni	46 Pd	64 Gd	82 Pb	88 At	100 Ac	109 (Nh)	110 (Nh)	127 (Nh)
29 Cu	47 Ag	65 Tb	83 Bi	89 At	111 Cf	110 (Nh)	111 (Nh)	128 (Nh)
30 Zn	48 Cd	66 Dy	84 Po	90 Th	112 (Nh)	111 (Nh)	112 (Nh)	129 (Nh)
31 Ga	49 In	67 Ho	85 At	91 Pa	113 (Nh)	112 (Nh)	113 (Nh)	130 (Nh)
32 Ge	50 Sn	68 Er	86 At	92 U	114 (Nh)	113 (Nh)	114 (Nh)	131 (Nh)
33 As	51 Sb	69 Tm	87 At	93 Np	115 (Nh)	114 (Nh)	115 (Nh)	132 (Nh)
34 Se	52 Te	70 Ru	88 At	94 Pu	116 (Nh)	115 (Nh)	116 (Nh)	133 (Nh)
35 Br	53 I	71 Rh	89 At	95 Am	117 (Nh)	116 (Nh)	117 (Nh)	134 (Nh)
36 Kr	54 Cs	72 Os	90 At	96 Cm	118 (Nh)	117 (Nh)	118 (Nh)	135 (Nh)
37 Rb	55 Ba	73 Hg	91 At	97 (Cs)	119 (Nh)	118 (Nh)	119 (Nh)	136 (Nh)
38 Sr	56 Ra	74 Tl	92 At	98 (Fr)	120 (Nh)	119 (Nh)	120 (Nh)	137 (Nh)
39 Y	57 La	75 W	93 At	99 Th	121 (Nh)	119 (Nh)	121 (Nh)	138 (Nh)
40 Zr	58 Ce	76 Re	94 At	100 Ac	122 (Nh)	120 (Nh)	122 (Nh)	139 (Nh)
41 Nb	59 Pr	77 Os	95 At	101 Md	123 (Nh)	121 (Nh)	123 (Nh)	140 (Nh)
42 Mo	60 Nd	78 Pt	96 At	102 (No)	124 (Nh)	122 (Nh)	124 (Nh)	141 (Nh)
43 Tc	61 Pm	79 Au	97 At	103 (Nh)	125 (Nh)	123 (Nh)	125 (Nh)	142 (Nh)
44 Ru	62 Sm	80 Tl	98 At	104 (Bg)	126 (Nh)	124 (Nh)	126 (Nh)	143 (Nh)
45 Rh	63 Eu	81 Hg	99 At	105 (Nh)	127 (Nh)	125 (Nh)	127 (Nh)	144 (Nh)
46 Pd	64 Gd	82 Pb	100 At	106 (Nh)	128 (Nh)	126 (Nh)	128 (Nh)	145 (Nh)
47 Ag	65 Tb	83 Bi	101 At	107 (Nh)	129 (Nh)	127 (Nh)	129 (Nh)	146 (Nh)
48 Cd	66 Dy	84 Po	102 At	108 (Nh)	130 (Nh)	128 (Nh)	128 (Nh)	147 (Nh)
49 In	67 Ho	85 At	103 At	109 (Nh)	131 (Nh)	129 (Nh)	129 (Nh)	148 (Nh)
50 Sn	68 Er	86 At	104 At	110 (Nh)	132 (Nh)	129 (Nh)	129 (Nh)	149 (Nh)
51 Sb	69 Tm	87 At	105 At	111 (Nh)	133 (Nh)	129 (Nh)	129 (Nh)	150 (Nh)
52 Te	70 Ru	88 At	106 At	112 (Nh)	134 (Nh)	129 (Nh)	129 (Nh)	151 (Nh)
53 I	71 Rh	89 At	107 At	113 (Nh)	135 (Nh)	129 (Nh)	129 (Nh)	152 (Nh)
54 Cs	72 Os	90 At	108 At	114 (Nh)	136 (Nh)	129 (Nh)	129 (Nh)	153 (Nh)
55 Ba	73 Hg	91 At	109 At	115 (Nh)	137 (Nh)	129 (Nh)	129 (Nh)	154 (Nh)
56 Ra	74 Tl	92 At	110 At	116 (Nh)	138 (Nh)	129 (Nh)	129 (Nh)	155 (Nh)
57 La	75 W	93 At	111 At	117 (Nh)	139 (Nh)	129 (Nh)	129 (Nh)	156 (Nh)
58 Ce	76 Re	94 At	112 At	118 (Nh)	140 (Nh)	129 (Nh)	129 (Nh)	157 (Nh)
59 Pr	77 Os	95 At	113 At	119 (Nh)	141 (Nh)	129 (Nh)	129 (Nh)	158 (Nh)
60 Nd	78 Pt	96 At	114 At	120 (Nh)	142 (Nh)	129 (Nh)	129 (Nh)	159 (Nh)
61 Pm	79 Au	97 At	115 At	121 (Nh)	143 (Nh)	129 (Nh)	129 (Nh)	160 (Nh)
62 Sm	80 Tl	98 At	116 At	122 (Nh)	144 (Nh)	129 (Nh)	129 (Nh)	161 (Nh)
63 Eu	81 Hg	99 At	117 At	123 (Nh)	145 (Nh)	129 (Nh)	129 (Nh)	162 (Nh)
64 Gd	82 Pb	100 At	118 At	124 (Nh)	146 (Nh)	129 (Nh)	129 (Nh)	163 (Nh)
65 Tb	83 Bi	101 At	119 At	125 (Nh)	147 (Nh)	129 (Nh)	129 (Nh)	164 (Nh)
66 Dy	84 Po	102 At	120 At	126 (Nh)	148 (Nh)	129 (Nh)	129 (Nh)	165 (Nh)
67 Ho	85 At	103 At	121 At	127 (Nh)	149 (Nh)	129 (Nh)	129 (Nh)	166 (Nh)
68 Er	86 At	104 At	122 At	128 (Nh)	150 (Nh)	129 (Nh)	129 (Nh)	167 (Nh)
69 Tm	87 At	105 At	123 At	129 (Nh)	151 (Nh)	129 (Nh)	129 (Nh)	168 (Nh)
70 Ru	88 At	106 At	124 At	130 (Nh)	152 (Nh)	129 (Nh)	129 (Nh)	169 (Nh)
71 Rh	89 At	107 At	125 At	131 (Nh)	153 (Nh)	129 (Nh)	129 (Nh)	170 (Nh)
72 Os	90 At	108 At	126 At	132 (Nh)	154 (Nh)	129 (Nh)	129 (Nh)	171 (Nh)
73 Pt	91 At	109 At	127 At	133 (Nh)	155 (Nh)	129 (Nh)	129 (Nh)	172 (Nh)
74 Au	92 At	110 At	128 At	134 (Nh)	156 (Nh)	129 (Nh)	129 (Nh)	173 (Nh)
75 Hg	93 At	111 At	129 At	135 (Nh)	157 (Nh)	129 (Nh)	129 (Nh)	174 (Nh)
76 Tl	94 At	112 At	130 At	136 (Nh)	158 (Nh)	129 (Nh)	129 (Nh)	175 (Nh)
77 Pb	95 At	113 At	131 At	137 (Nh)	159 (Nh)	129 (Nh)	129 (Nh)	176 (Nh)
78 Bi	96 At	114 At	132 At	138 (Nh)	160 (Nh)	129 (Nh)	129 (Nh)	177 (Nh)
79 At	97 At	115 At	133 At	139 (Nh)	161 (Nh)	129 (Nh)	129 (Nh)	178 (Nh)
80 Po	98 At	116 At	134 At	140 (Nh)	162 (Nh)	129 (Nh)	129 (Nh)	179 (Nh)
81 At	99 At	117 At	135 At	141 (Nh)	163 (Nh)	129 (Nh)	129 (Nh)	180 (Nh)
82 Fr	100 At	118 At	136 At	142 (Nh)	164 (Nh)	129 (Nh)	129 (Nh)	181 (Nh)
83 Rn	101 At	119 At	137 At	143 (Nh)	165 (Nh)	129 (Nh)	129 (Nh)	182 (Nh)
84 At	102 At	120 At	138 At	144 (Nh)	166 (Nh)	129 (Nh)	129 (Nh)	183 (Nh)
85 At	103 At	121 At	139 At	145 (Nh)	167 (Nh)	129 (Nh)	129 (Nh)	184 (Nh)
86 At	104 At	122 At	140 At	146 (Nh)	168 (Nh)	129 (Nh)	129 (Nh)	185 (Nh)
87 Fr	105 At	123 At	141 At	147 (Nh)	169 (Nh)	129 (Nh)	129 (Nh)	186 (Nh)
88 Rn	106 At	124 At	142 At	148 (Nh)	170 (Nh)	129 (Nh)	129 (Nh)	187 (Nh)
89 At	107 At	125 At	143 At	149 (Nh)	171 (Nh)	129 (Nh)	129 (Nh)	188 (Nh)
90 At	108 At	126 At	144 At	150 (Nh)	172 (Nh)	129 (Nh)	129 (Nh)	189 (Nh)
91 At	109 At	127 At	145 At	151 (Nh)	173 (Nh)	129 (Nh)	129 (Nh)	190 (Nh)
92 At	110 At	128 At	146 At	152 (Nh)	174 (Nh)	129 (Nh)	129 (Nh)	191 (Nh)
93 At	111 At	129 At	147 At	153 (Nh)	175 (Nh)	129 (Nh)	129 (Nh)	192 (Nh)
94 At	112 At	130 At	148 At	154 (Nh)	176 (Nh)	129 (Nh)	129 (Nh)	193 (Nh)
95 At	113 At	131 At	149 At	155 (Nh)	177 (Nh)	129 (Nh)	129 (Nh)	194 (Nh)
96 At	114 At	132 At	150 At	156 (Nh)	178 (Nh)	129 (Nh)	129 (Nh)	195 (Nh)
97 At	115 At	133 At	151 At	157 (Nh)	179 (Nh)	129 (Nh)	129 (Nh)	196 (Nh)
98 At	116 At	134 At	152 At	158 (Nh)	180 (Nh)	129 (Nh)	129 (Nh)	197 (Nh)
99 At	117 At	135 At	153 At	159 (Nh)	181 (Nh)	129 (Nh)	129 (Nh)	198 (Nh)
100 At	118 At	136 At	154 At	160 (Nh)	182 (Nh)	129 (Nh)	129 (Nh)	199 (Nh)
101 At	119 At	137 At	155 At	161 (Nh)	183 (Nh)	129 (Nh)	129 (Nh)	200 (Nh)
102 At	120 At	138 At	156 At	162 (Nh)	184 (Nh)	129 (Nh)	129 (Nh)	201 (Nh)
103 At	121 At	139 At	157 At	163 (Nh)	185 (Nh)	129 (Nh)	129 (Nh)	202 (Nh)
104 At	122 At	140 At	158 At	164 (Nh)	186 (Nh)	129 (Nh)	129 (Nh)	203 (Nh)
105 At	123 At	141 At	159 At	165 (Nh)	187 (Nh)	129 (Nh)	129 (Nh)	204 (Nh)
106 At	124 At	142 At	160 At	166 (Nh)	188 (Nh)	129 (Nh)	129 (Nh)	205 (Nh)
107 At	125 At	143 At	161 At	167 (Nh)	189 (Nh)	129 (Nh)	129 (Nh)	206 (Nh)
108 At	126 At	144 At	162 At	168 (Nh)	190 (Nh)	129 (Nh)	129 (Nh)	207 (Nh)
109 At	127 At	145 At	163 At	169 (Nh)	191 (Nh)	129 (Nh)	129 (Nh)	208 (Nh)
110 At	128 At	146 At	164 At	170 (Nh)	192 (Nh)	129 (Nh)	129 (Nh)	209 (Nh)
111 At	129 At	147 At	165 At	171 (Nh)	193 (Nh)	129 (Nh)	129 (Nh)	210 (Nh)
112 At	130 At	148 At	166 At	172 (Nh)	194 (Nh)	129 (Nh)	129 (Nh)	211 (Nh)
113 At	131 At	149 At	167 At	173 (Nh)	195 (Nh)	129 (Nh)	129 (Nh)	212 (Nh)
114 At	132 At	150 At	168 At	174 (Nh)	196 (Nh)	129 (Nh)	129 (Nh)	213 (Nh)
115 At	133 At	151 At	169 At	175 (Nh)	197 (Nh)	129 (Nh)	129 (Nh)	214 (Nh)
116 At	134 At	152 At	170 At	176 (Nh)	198 (Nh)	129 (Nh)	129 (Nh)	215 (Nh)
117 At	135 At	153 At	171 At	177 (Nh)	199 (Nh)	129 (Nh)	129 (Nh)	216 (Nh)
118 At	136 At	154 At	172 At	178 (Nh)	200 (Nh)	129 (Nh)	129 (Nh)	217 (Nh)
119 At	137 At	155 At	173 At	179 (Nh)	201 (Nh)	129 (Nh)	129 (Nh)	218 (Nh)
120 At	138 At	156 At	174 At	180 (Nh)	202 (Nh)	129 (Nh)	129 (Nh)	219 (Nh)
121 At	139 At	157 At	175 At	181 (Nh)	203 (Nh)	129 (Nh)	129 (Nh)	220 (Nh)
122 At	140 At	158 At	176 At	182 (Nh)	204 (Nh)	129 (Nh)	129 (Nh)	221 (Nh)
123 At	141 At	159 At	177 At	183 (Nh)	205 (Nh)	129 (Nh)	129 (Nh)	222 (Nh)
124 At	142 At	160 At	178 At	184 (Nh)	206 (Nh)	129 (Nh)	129 (Nh)	223 (Nh)
125 At	143 At	161 At	179 At	185 (Nh)	207 (Nh)	129 (Nh)	129 (Nh)	224 (Nh)
126 At	144 At	162 At	180 At	186 (Nh)	208 (Nh)	129 (Nh)	129 (Nh)	225 (Nh)
127 At	145 At	163 At	181 At	187 (Nh)	209 (Nh)	129 (Nh)	129 (Nh)	226 (Nh)
128 At	146 At	164 At	182 At	188 (Nh)	210 (Nh)	129 (Nh)	129 (Nh)	227 (Nh)
129 At	147 At	165 At	183 At	189 (Nh)	211 (Nh)	129 (Nh)	129 (Nh)	228 (Nh)
130 At	148 At	166 At	184 At	190 (Nh)	212 (Nh)	129 (Nh)	129 (Nh)	229 (Nh)
131 At	149 At	167 At	185 At	191 (Nh)	213 (Nh)	129 (Nh)	129 (Nh)	230 (Nh)
132 At	150 At	168 At	186 At	192 (Nh)	214 (Nh)	129 (Nh)	129 (Nh)	231 (Nh)
133 At	151 At	169 At	187 At	193 (Nh)	215 (Nh)	129 (Nh)	129 (Nh)	232 (Nh)
134 At	152 At	170 At	188 At	194 (Nh)	216 (Nh)	129 (Nh)	129 (Nh)	233 (Nh)
135 At	153 At	171 At	189 At	195 (Nh)	217 (Nh)	129 (Nh)	129 (Nh)	234 (Nh)
136 At	154 At	172 At	190 At	196 (Nh)	218 (Nh)	129 (Nh)	129 (Nh)	235 (Nh)
137 At	155 At	173 At	191 At	197 (Nh)	219 (Nh)	129 (Nh)	129 (Nh)	236 (Nh)
138 At	156 At	174 At	192 At	198 (Nh)	220 (Nh)	129 (Nh)	129 (Nh)	237 (Nh)
139 At	157 At	175 At	193 At	199 (Nh)	221 (Nh)	129 (Nh)	129 (Nh)	238 (Nh)
140 At	158 At	176 At	194 At	200 (Nh)	222 (Nh)	129 (Nh)	129 (Nh)	239 (Nh)
141 At	159 At	177 At	195 At	201 (Nh)	223 (Nh)	129 (Nh)	129 (Nh)	240 (Nh)
142 At	160 At	178 At	196 At	202 (Nh)	224 (Nh)	129 (Nh)	129 (Nh)	241 (Nh)
143 At	161 At	179 At	197 At	203 (Nh)	225 (Nh)	129 (Nh)	129 (Nh)	242 (Nh)
144 At	162 At	180 At	198 At	204 (Nh)	226 (Nh)	129 (Nh)	129 (Nh)	243 (Nh)
145 At	163 At	181 At	199 At	205 (Nh)	227 (Nh)	129 (Nh)	129 (Nh)	244 (Nh)
146 At	164 At	182 At	200 At	206 (Nh)	228 (Nh)	129 (Nh)	129 (Nh)	245 (Nh)
147 At	165 At	183 At	201 At	207 (Nh)	229 (Nh)	129 (Nh)	129 (Nh)	246 (Nh)
148 At	166 At	184 At	202 At	208 (Nh)	230 (Nh)	129 (Nh)	129 (Nh)	247 (Nh)
149 At	167 At	185 At	203 At	209 (Nh)	231 (Nh)	129 (Nh)	129 (Nh)	248 (Nh)
150 At	168 At	186 At	204 At	210 (Nh)	232 (Nh)	129 (Nh)	129 (Nh)	249 (Nh)
151 At								



# CERTIFICATE OF ANALYSIS

ERM<sup>®</sup>-AE639

## Hg in a solution of 0.5 M HCl + 0.05 % (m/v) K<sub>2</sub>Cr<sub>2</sub>O<sub>7</sub>

		Certified value <sup>1</sup>	Uncertainty <sup>2</sup>
amount content	mol ( <sup>202</sup> Hg) · g <sup>-1</sup> (solution)	1.189 1 · 10 <sup>-4</sup>	0.005 0 · 10 <sup>-4</sup>
amount ratios	$n(^{160}\text{Hg})/n(^{202}\text{Hg})$	0.004 972	0.000 046
	$n(^{160}\text{Hg})/n(^{202}\text{Hg})$	0.330 6	0.002 1
	$n(^{164}\text{Hg})/n(^{202}\text{Hg})$	0.561 9	0.002 8
	$n(^{200}\text{Hg})/n(^{202}\text{Hg})$	0.770 5	0.002 8
	$n(^{201}\text{Hg})/n(^{202}\text{Hg})$	0.441 26	0.000 88
	$n(^{204}\text{Hg})/n(^{202}\text{Hg})$	0.230 27	0.000 75

1) The values of the Hg isotope ratios are traceable to the SI via the values of the Tl isotope ratios of the isotopic reference material NIST SRM 887. The Hg content of the natural isotopic spike is traceable to Hg amount content measurements based on gravimetry, whereby a mass of pure substance (Hg<sub>2</sub>Cl<sub>2</sub>) was weighed and corrections were made for impurities.

2) Estimated expanded uncertainty U with a coverage factor k=2, corresponding to a level of confidence of about 95 %, as defined in the Guide to the Expression of Uncertainty in Measurement (GUM), ISO, 1995.

This certificate is valid until 6/2014; this validity may be extended as further evidence of stability becomes available. The material can be regarded as a homogenous solution.

Accepted as an CRM, Geel, June 2004  
revised December 2006

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**NOTE**

European Reference Material ERM®-AE639 was originally certified as IRMM-639. It was produced and certified under the responsibility of the IRMM according to the principles laid down in the technical guidelines of the European Reference Materials® co-operation agreement between BAM-IRMM-LGC. Information on these guidelines is available on the Internet (<http://www.erm-crm.org>). A detailed technical report on the certification procedure can be found in IRMM Internal Report GE/R/IM/40/99, available from IRMM on explicit request.

**DESCRIPTION OF THE SAMPLE**

The Spike Isotopic Reference Material ERM®-AE639 is supplied with a certified isotope amount content of  $^{202}\text{Hg}$ . The samples are supplied in flame-sealed glass ampoules and contain about 0.2  $\mu\text{mol}$  of mercury in 5 mL of a hydrochloric acid solution. The matrix is 0.5 M sub-boiling distilled hydrochloric acid + 0.05 % (m/v) potassium dichromate.

From the certified values, the following amount and mass contents, the isotopic composition of Hg and the molar mass are derived:

		Certified value	$U (k=2)^1$
amount content	$\text{mol}(\text{Hg}) \cdot \text{g}^{-1}$ (solution)	$3.971 \cdot 10^{-6}$	$0.015 \cdot 10^{-6}$
mass content	$\text{g} (^{202}\text{Hg}) \cdot \text{g}^{-1}$ (solution)	$2.402 \cdot 10^{-6}$	$0.010 \cdot 10^{-6}$
	$\text{g}(\text{Hg}) \cdot \text{g}^{-1}$ (solution)	$7.966 \cdot 10^{-6}$	$0.030 \cdot 10^{-6}$
isotope amount fractions of Hg (·100)	$n(^{190}\text{Hg})/n(\text{Hg})$	0.148 9	0.001 3
	$n(^{192}\text{Hg})/n(\text{Hg})$	9.900	0.052
	$n(^{198}\text{Hg})/n(\text{Hg})$	16.826	0.064
	$n(^{200}\text{Hg})/n(\text{Hg})$	23.073	0.058
	$n(^{201}\text{Hg})/n(\text{Hg})$	13.213	0.025
	$n(^{202}\text{Hg})/n(\text{Hg})$	29.944	0.053
	$n(^{204}\text{Hg})/n(\text{Hg})$	6.895	0.030
isotope mass fractions of Hg (·100)	$m(^{190}\text{Hg})/m(\text{Hg})$	0.145 4	0.001 2
	$m(^{192}\text{Hg})/m(\text{Hg})$	9.769	0.052
	$m(^{198}\text{Hg})/m(\text{Hg})$	16.689	0.064
	$m(^{200}\text{Hg})/m(\text{Hg})$	23.000	0.058
	$m(^{201}\text{Hg})/m(\text{Hg})$	13.237	0.025
	$m(^{202}\text{Hg})/m(\text{Hg})$	30.148	0.053
	$m(^{204}\text{Hg})/m(\text{Hg})$	7.011	0.030
molar mass of Hg	$\text{g} \cdot \text{mol}^{-1}$	200.604 1	0.003 2

<sup>1</sup>All uncertainties indicated are expanded uncertainties  $U = k \cdot u_c$  where  $u_c$  is the combined standard uncertainty estimated following the ISO/BIPM Guide to the Expression of Uncertainty in Measurement.

### Atomic masses used for calculation of the derived values:

G. Audi and A.H. Wapstra, The 1993 atomic mass evaluation, *Nucl Phys A565* (1993) 1-65.

Isotope	$\text{g} \cdot \text{mol}^{-1}$	$U (k=2)$
$^{195}\text{Hg}$	195.965 814	0.000 008
$^{196}\text{Hg}$	197.966 752	0.000 006
$^{198}\text{Hg}$	198.968 262	0.000 006
$^{200}\text{Hg}$	199.968 309	0.000 006
$^{201}\text{Hg}$	200.970 285	0.000 006
$^{202}\text{Hg}$	201.970 625	0.000 006
$^{204}\text{Hg}$	203.973 475	0.000 006

### ANALYTICAL METHOD USED FOR CERTIFICATION

The mercury mass fraction was calculated from gravimetric data, taking results from impurity measurements and uncertainties into account. The isotopic composition was determined by ICP-MS.

### PARTICIPANTS

EC-DG-JRC, Institute for Reference Materials and Measurements, Isotope Materials Unit, Retieseweg 111, 2440 Geel, Belgium

### SAFETY INFORMATION

The usual laboratory safety precautions apply

### INSTRUCTIONS FOR USE

Using this spike isotopic reference material, the Hg content in an unknown sample can be determined by Isotope Dilution, through a measurement of the mercury isotope amount ratio  $R(B) = n(^{200}\text{Hg})/n(^{202}\text{Hg})$ , in a blend. It should be calculated with the aid of the following equation, which enables an easy quantification of the uncertainty sources in the procedure:

$$c(\text{Hg}, X) = \frac{R(Y) - R(B)}{R(B) - R(X)} \cdot \frac{\sum R_i(X)}{\sum R_i(Y)} \cdot \frac{m(Y)}{m(X)} \cdot c(\text{Hg}, Y)$$

where:

- $R(X)$  = amount ratio  $n(^{200}\text{Hg})/n(^{202}\text{Hg})$  in the unknown sample material X
- $R(Y)$  = amount ratio  $n(^{200}\text{Hg})/n(^{202}\text{Hg})$  in the spike material Y
- $\sum R_i(X)$  = sum of all amount ratios in the unknown sample material X
- $\sum R_i(Y)$  = sum of all amount ratios in the spike material Y
- $m(X)$  = mass of unknown sample used in the measurement
- $m(Y)$  = mass of the sample of spike solution used in the measurement
- $c(\text{Hg}, X)$  = amount content of  $\text{Hg} \cdot \text{g}^{-1}$  sample material
- $c(\text{Hg}, Y)$  = amount content of  $\text{Hg} \cdot \text{g}^{-1}$  spike solution

## STORAGE

The material may be stored at 18 °C in the dark.

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## Спектограмма №18

