

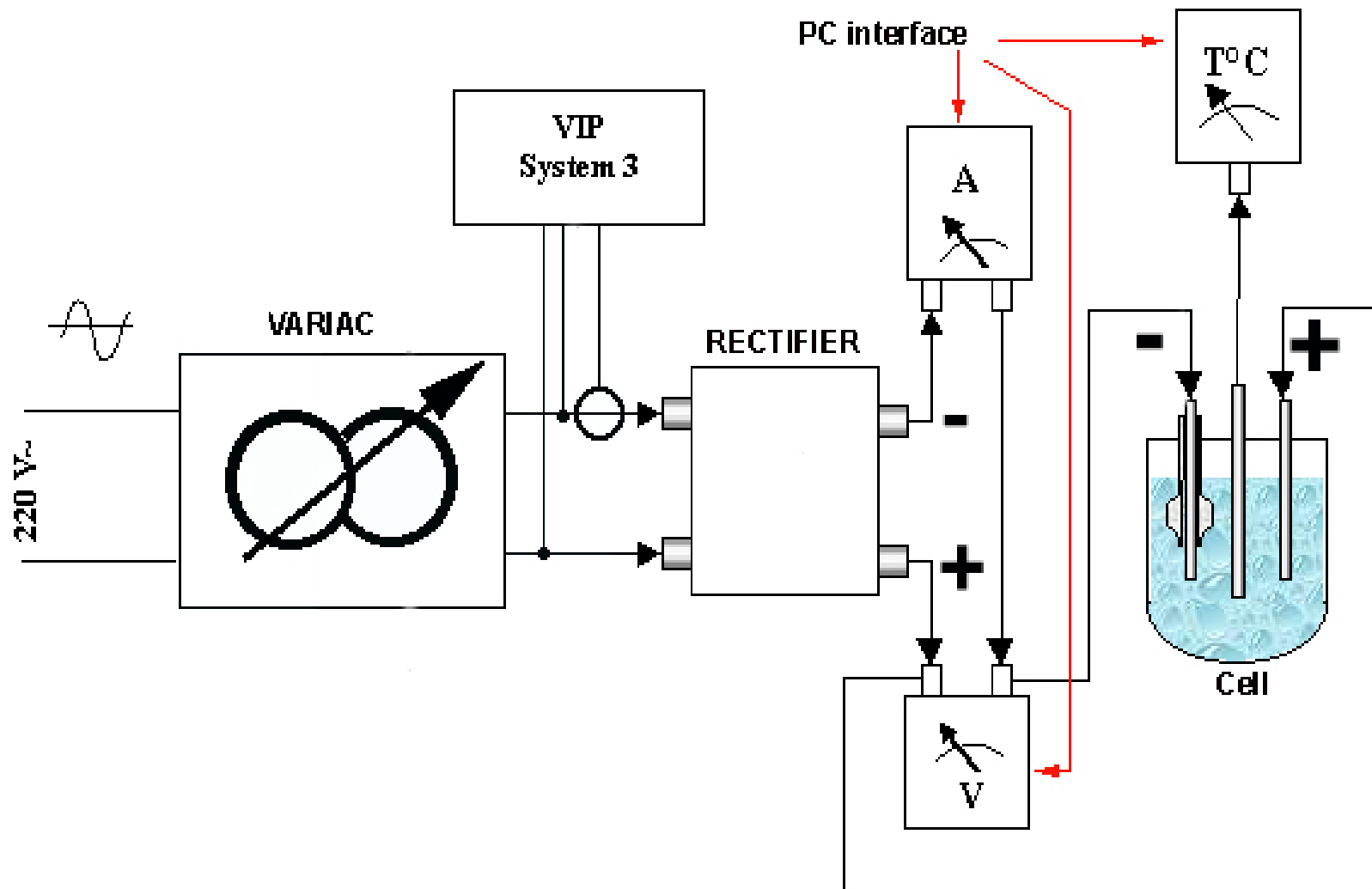
TRASMUTATION OF METAL TO LOW ENERGY IN CONFINED PLASMA IN THE WATER

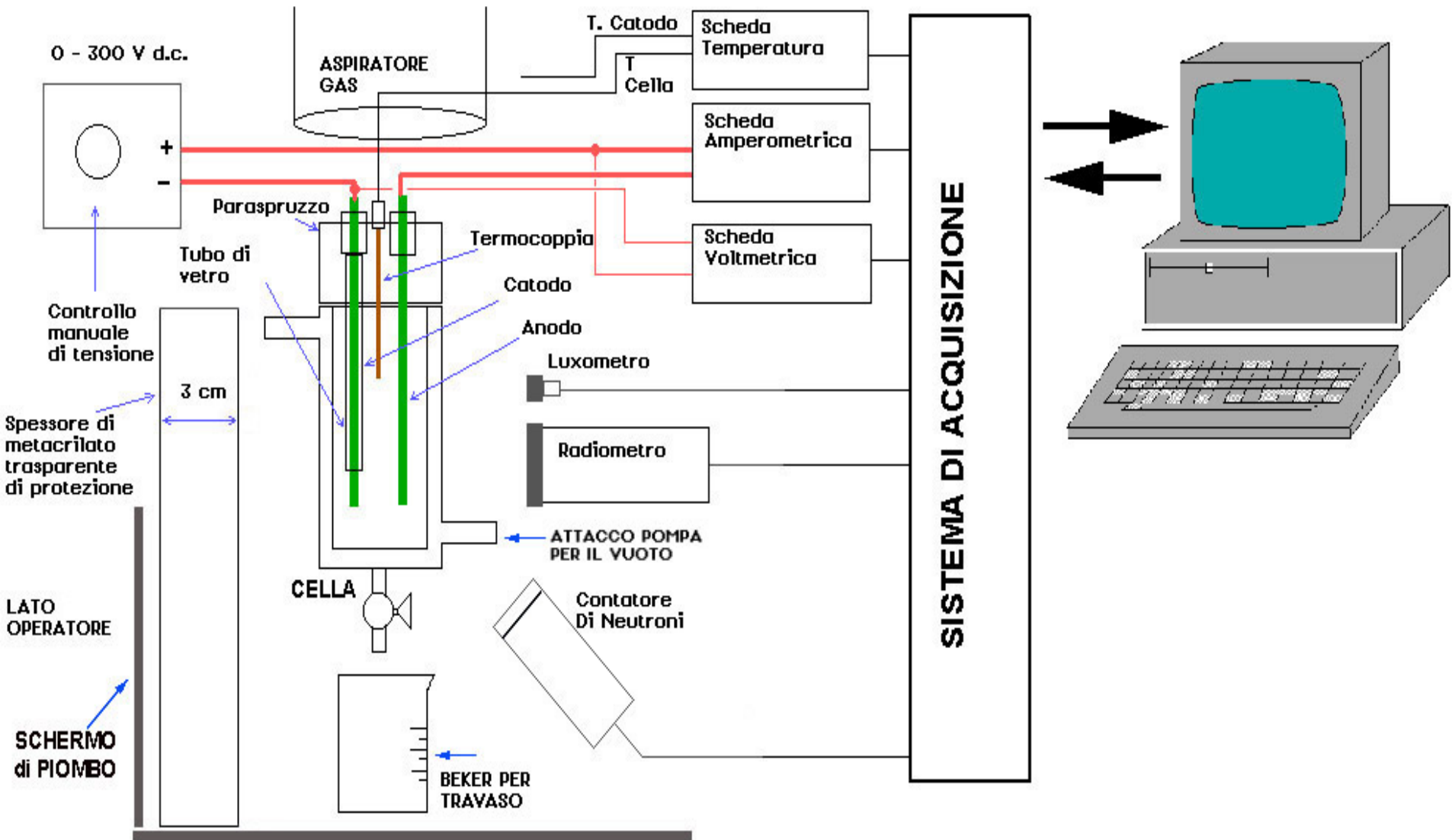
by:

Domenico Cirillo

Alessandro Dattilo

Vincenzo Iorio

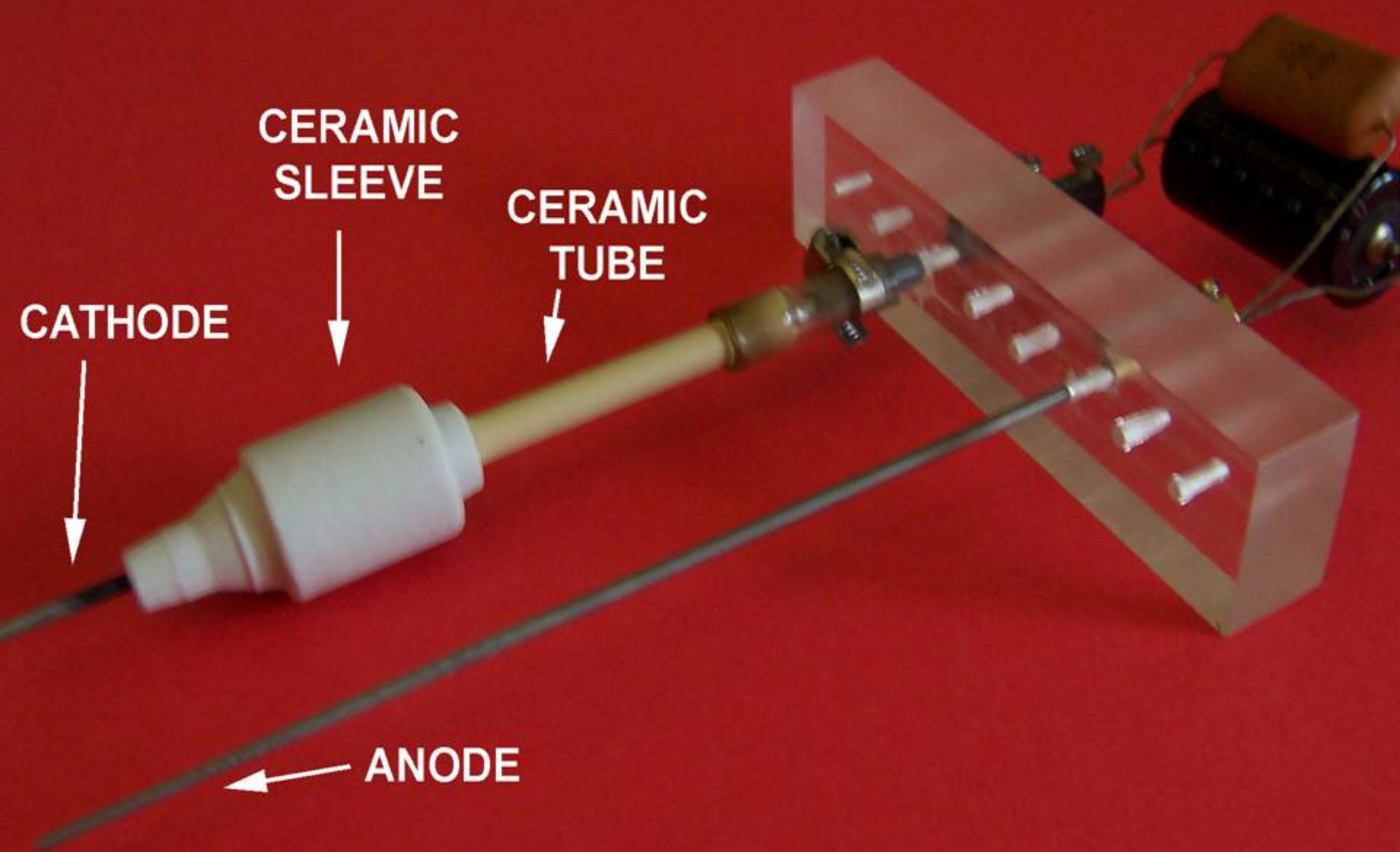




Pirometro

luxometro

finestra sensore

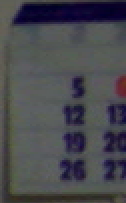
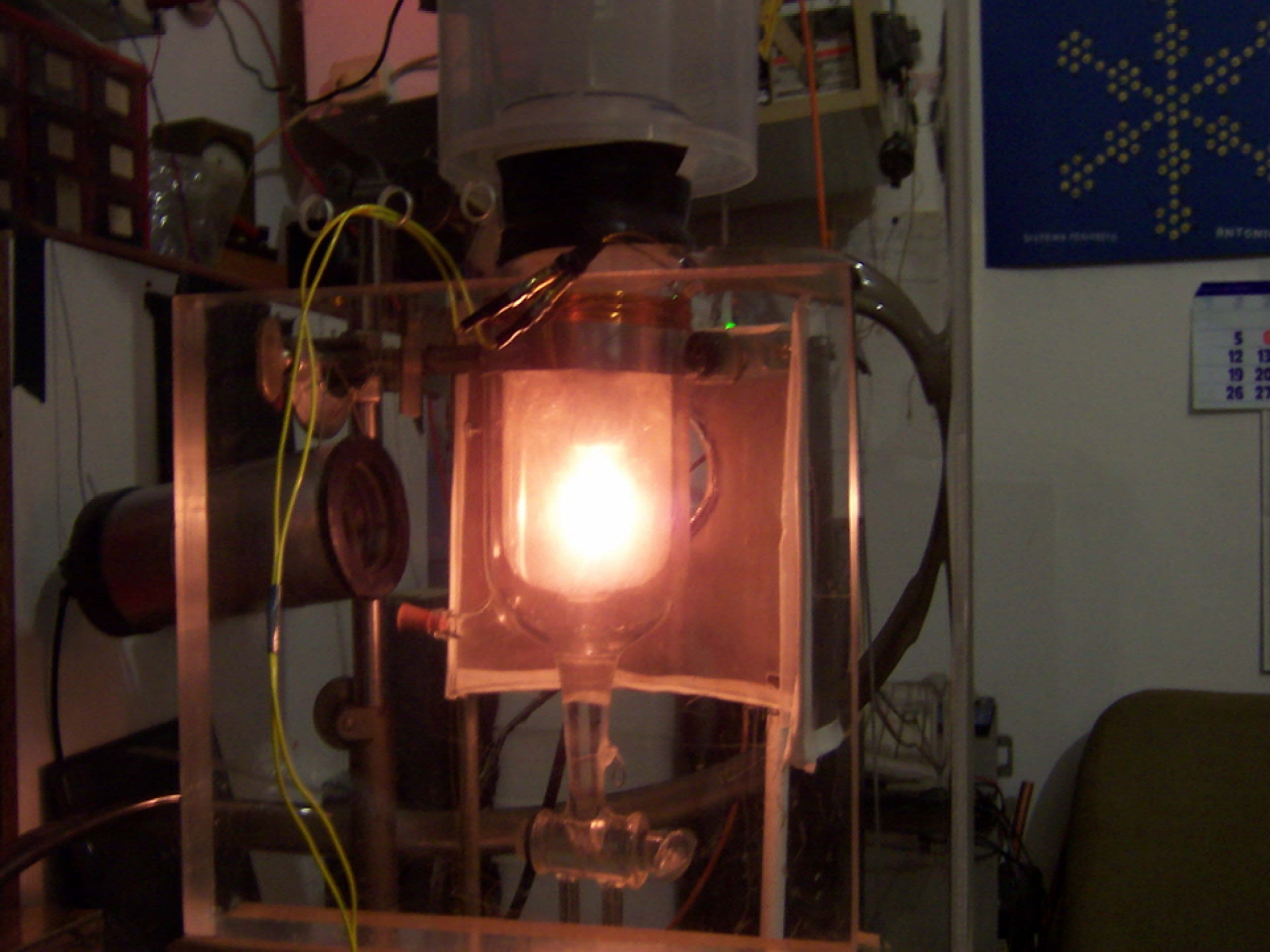



CERAMIC
SLEEVE

CERAMIC
TUBE

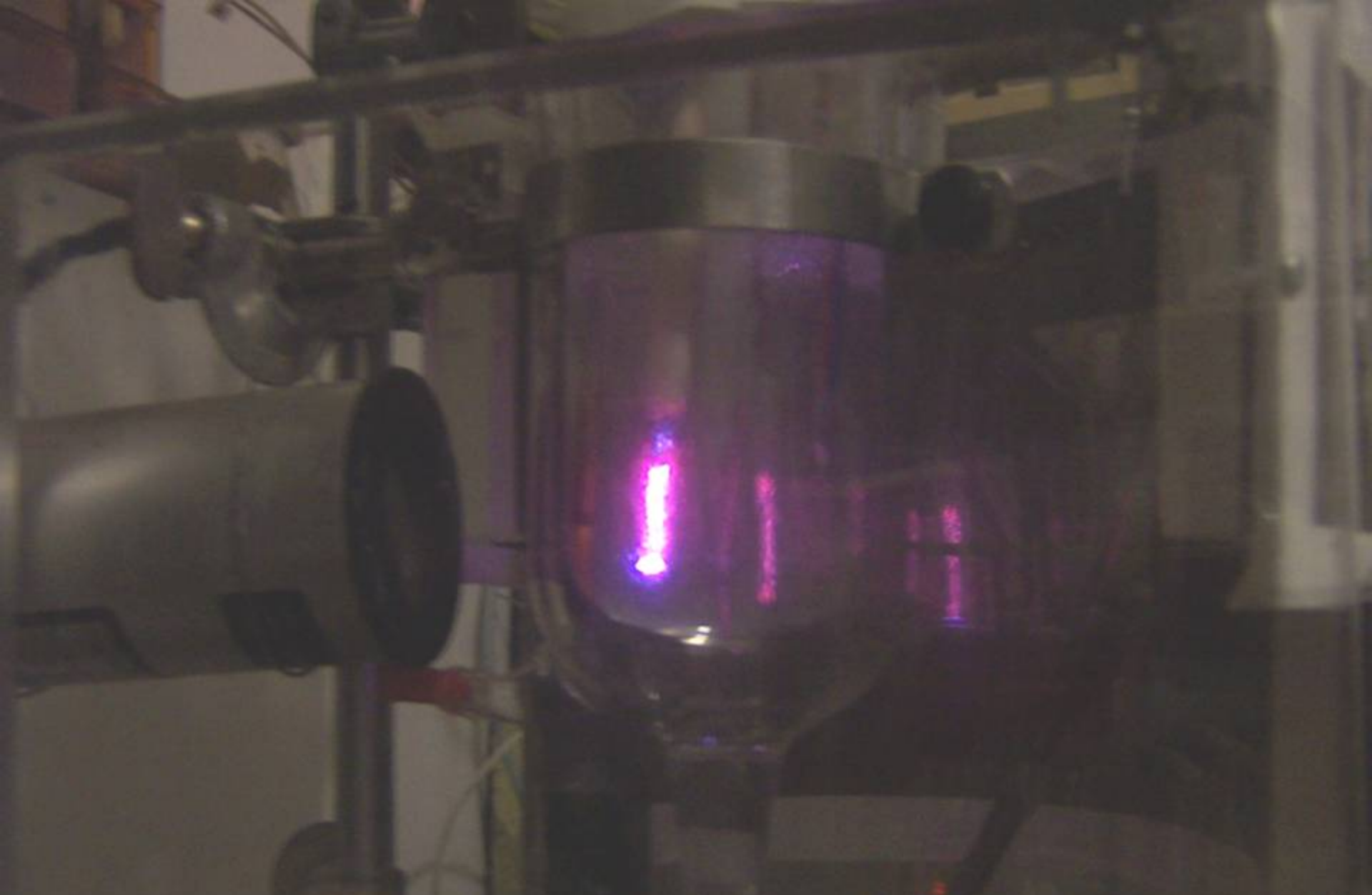
CATHODE

ANODE





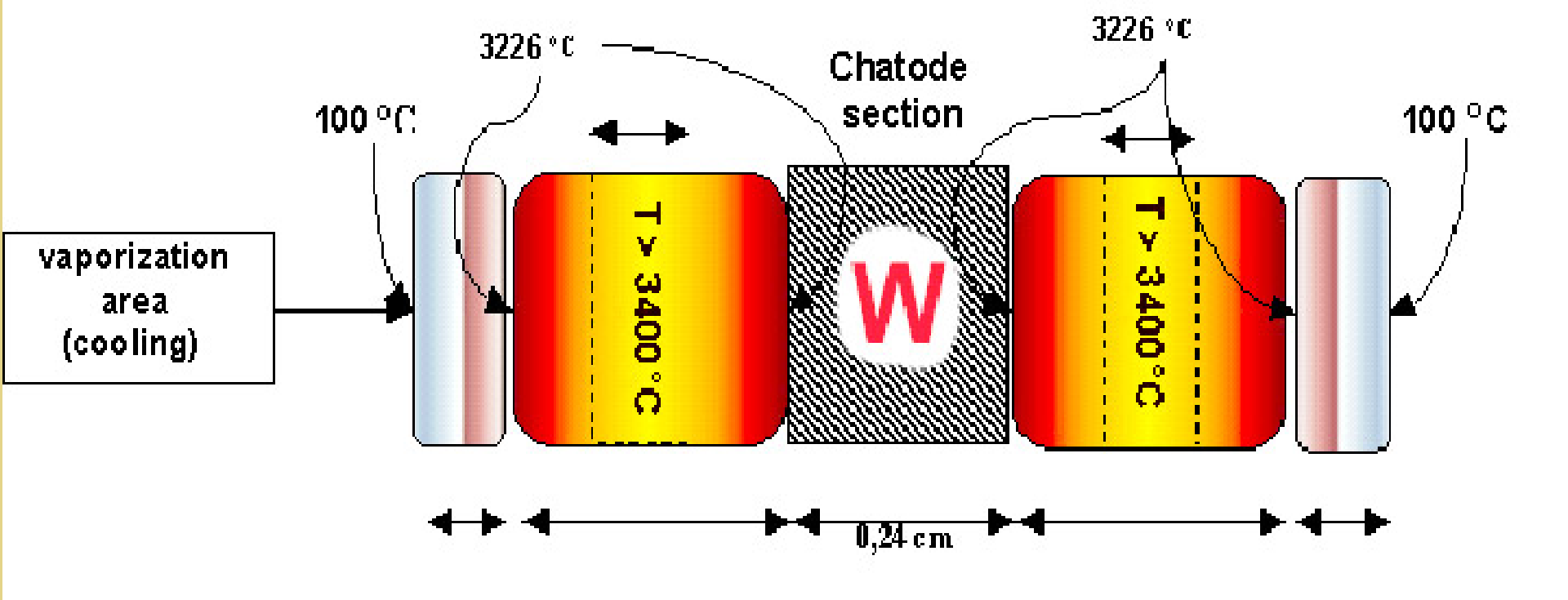
File n.34 Prova Alchemi2 del 16/10/2004

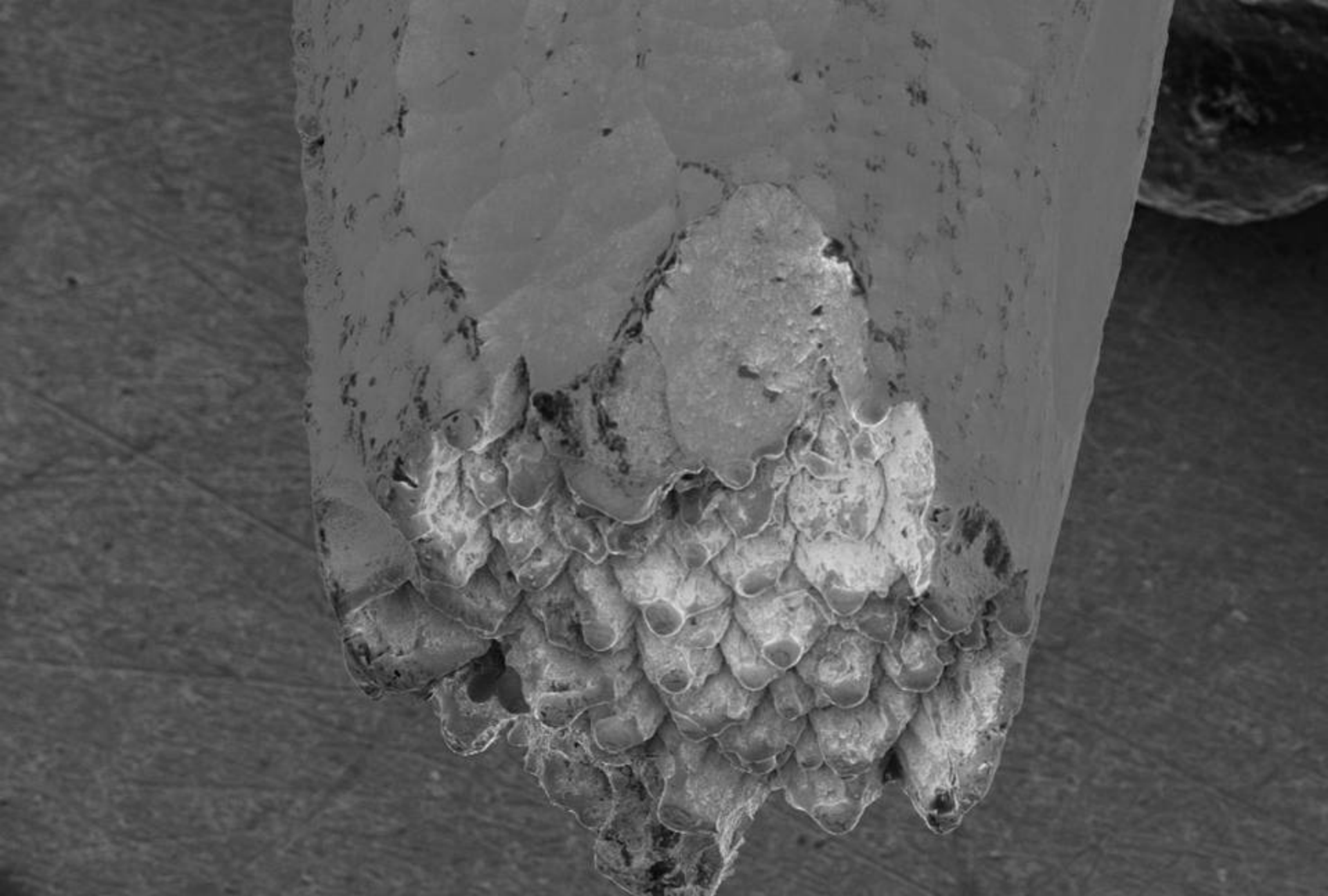


File n.34 prova Alchemi2 del 16/10/2004



UNSTABLE PLASMA (december 2003)





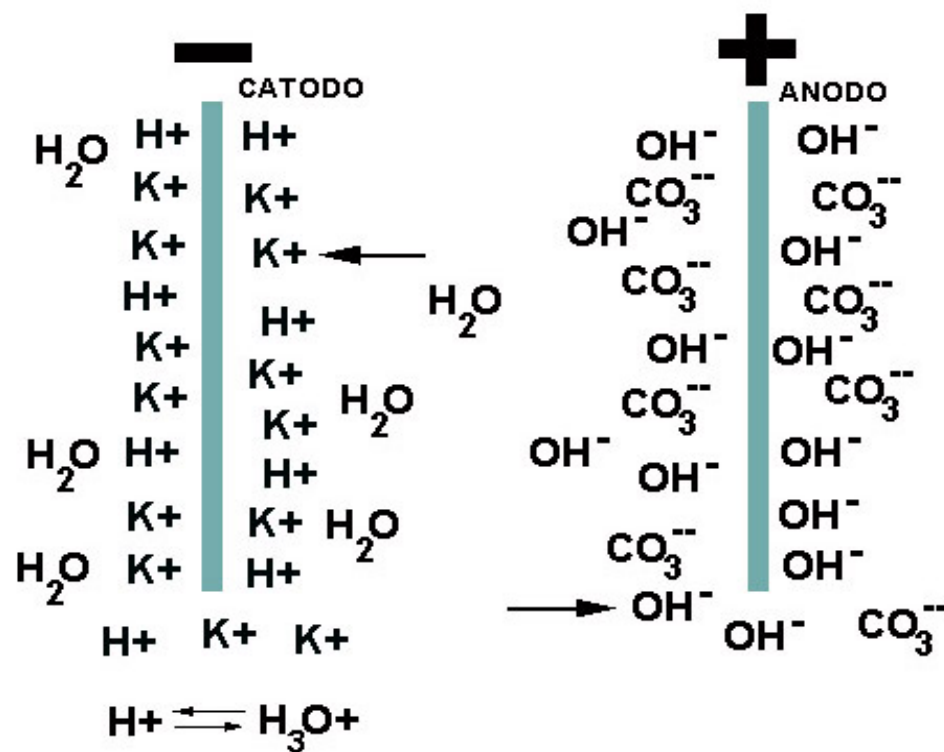
Mag = 37 X

200µm
|-----|

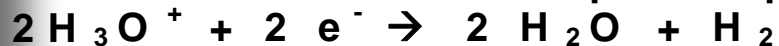
EHT = 20.00 kV
WD = 19 mm

Signal A = InLens
Photo No. = 298

Date :13 Jan 2004
Time :16:49:01

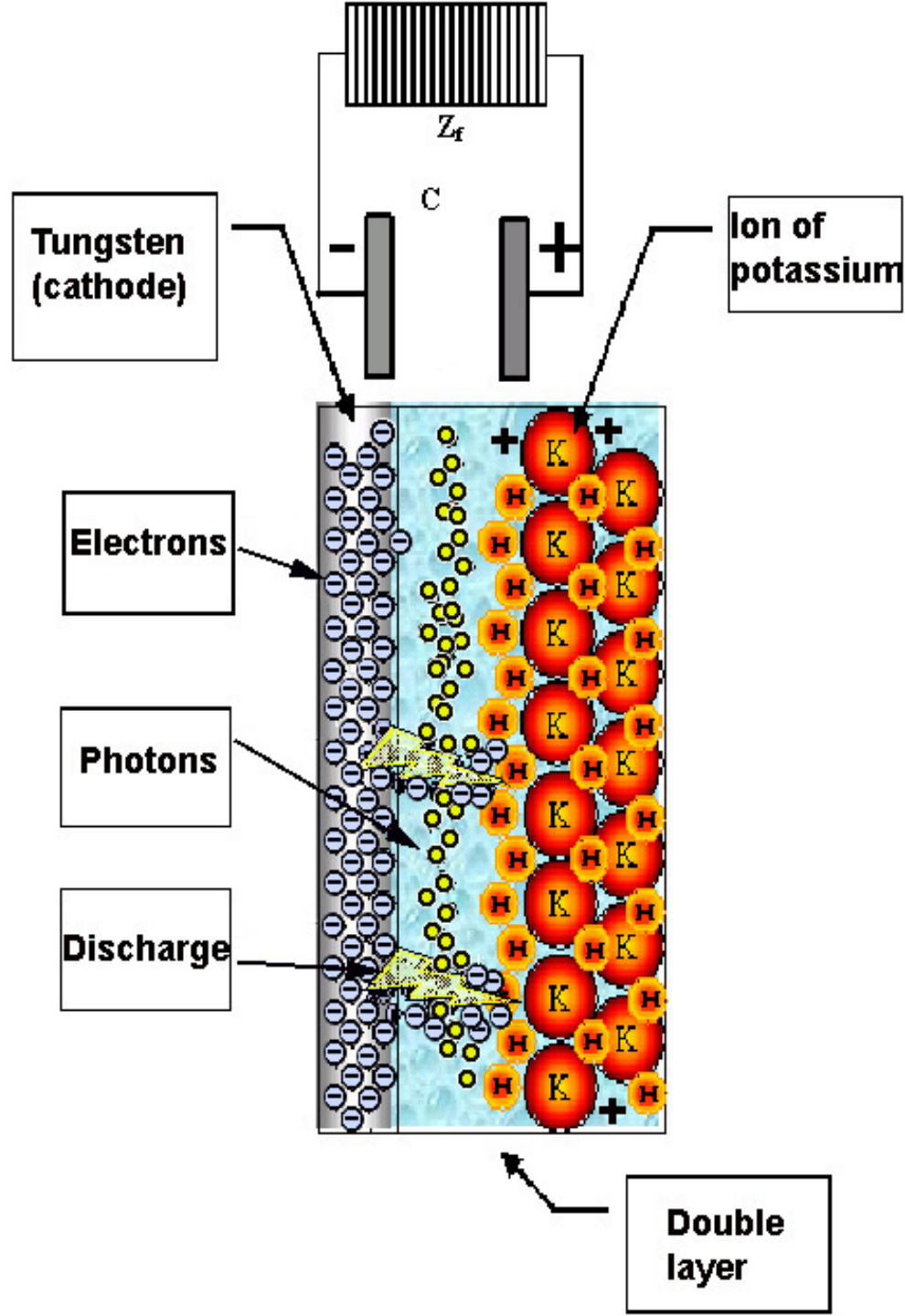


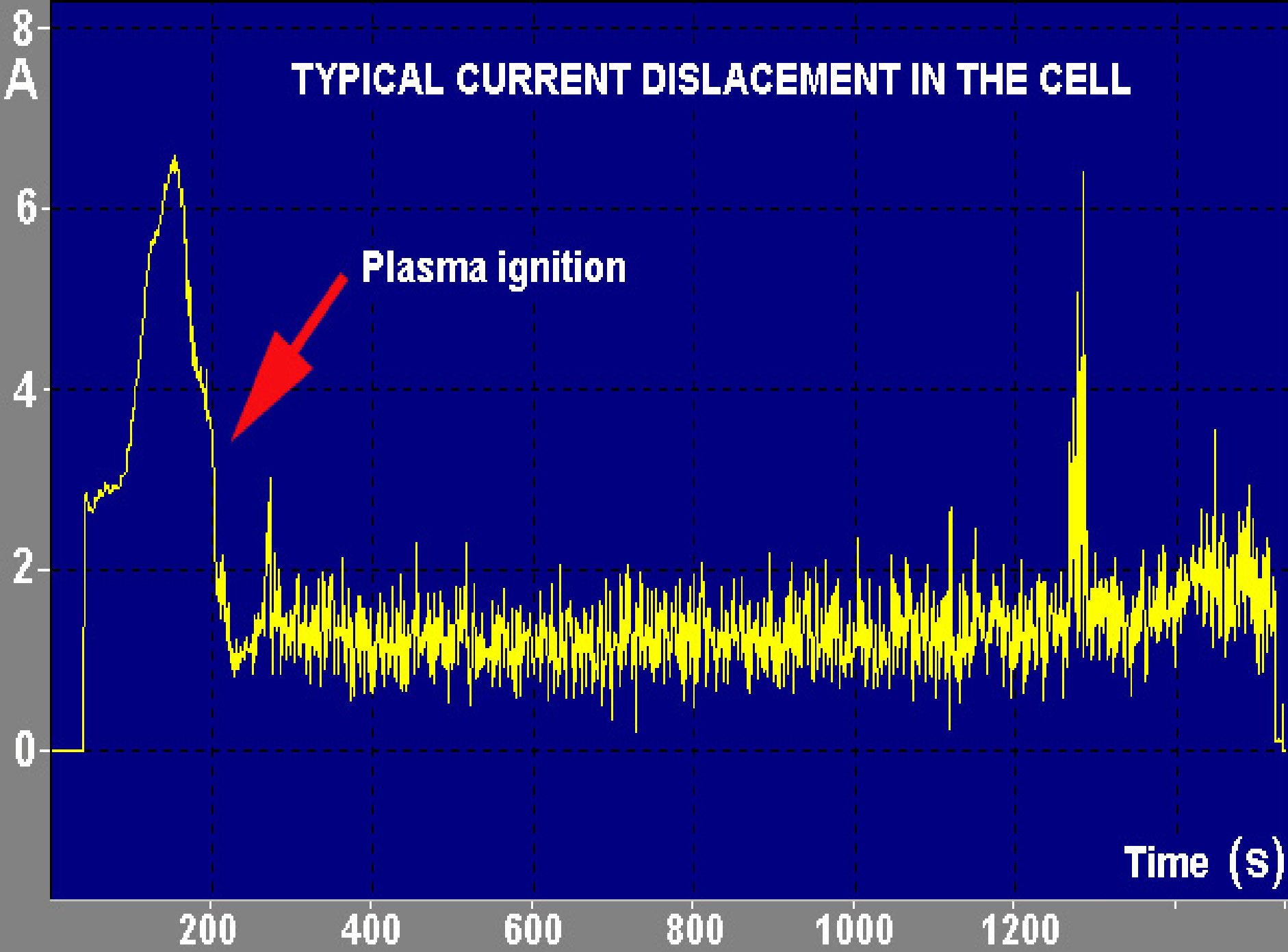
Reazione catodica principale

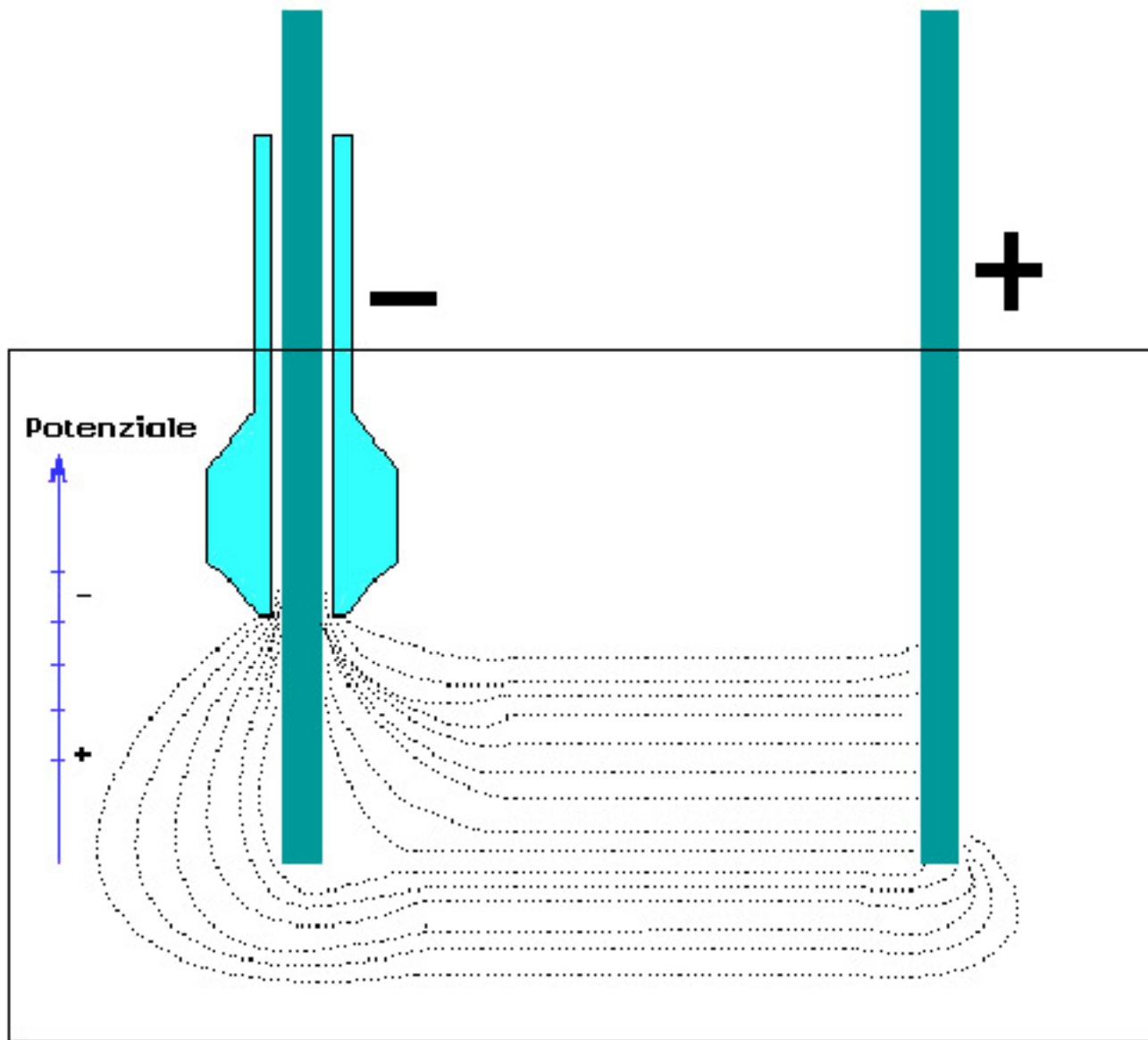


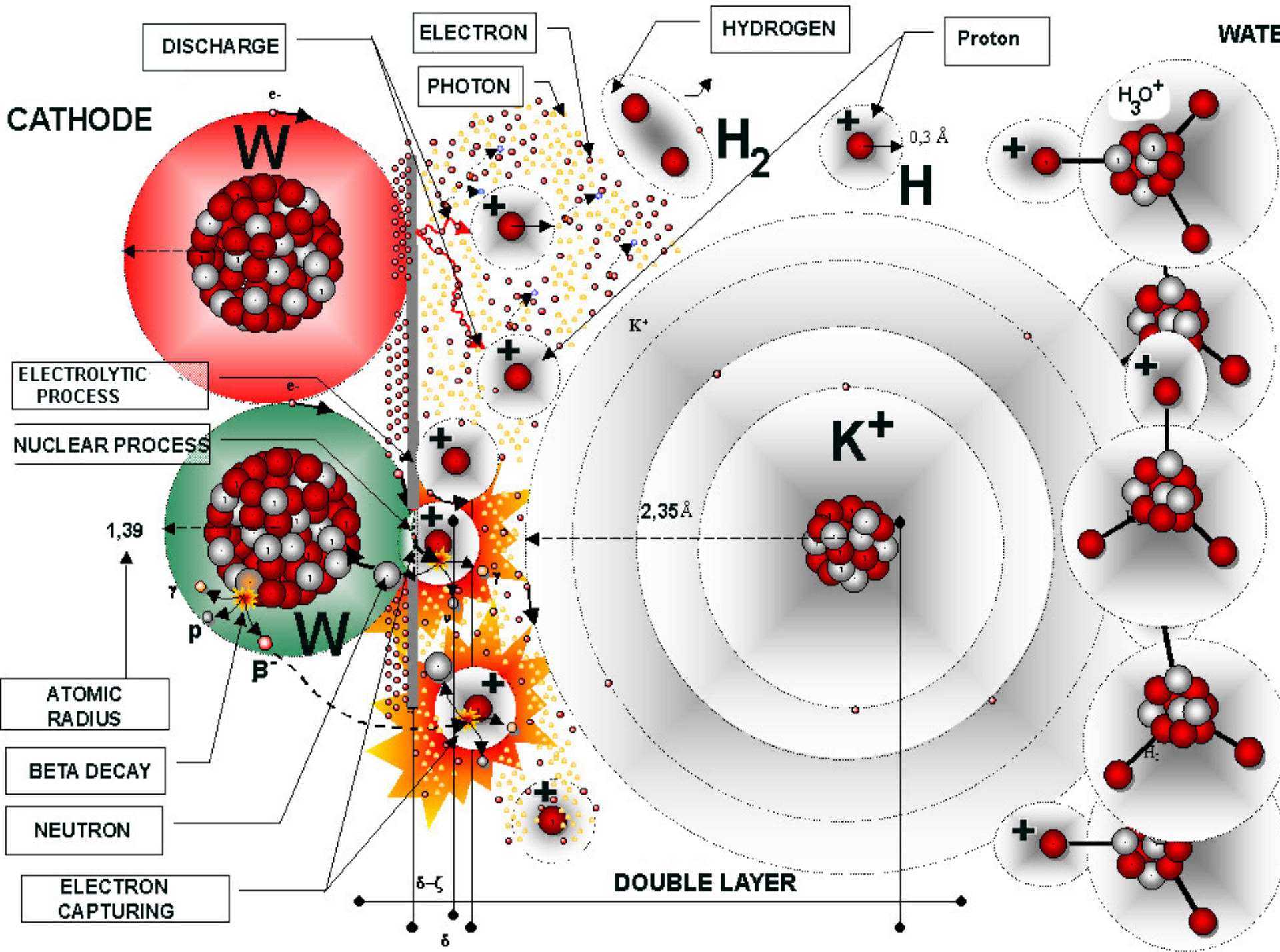
Reazione anodica principale

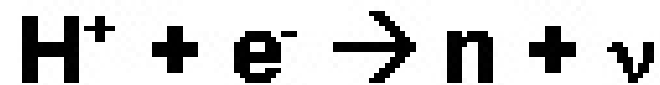
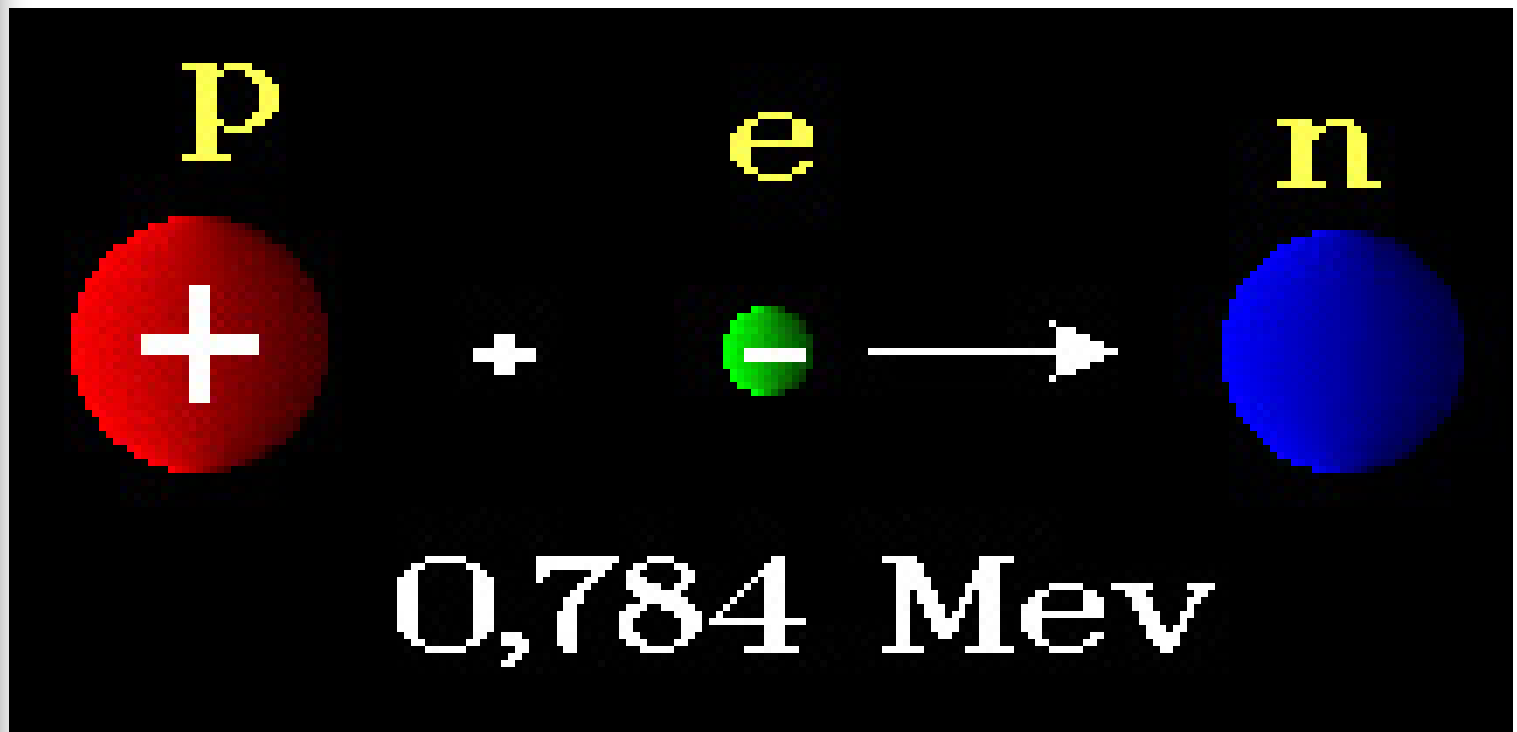




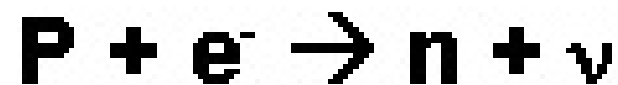


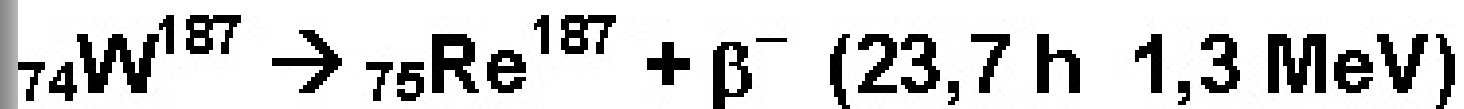
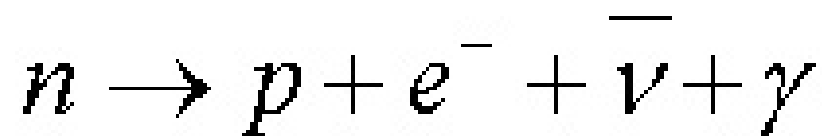
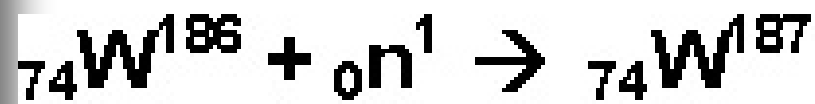










o identicamente



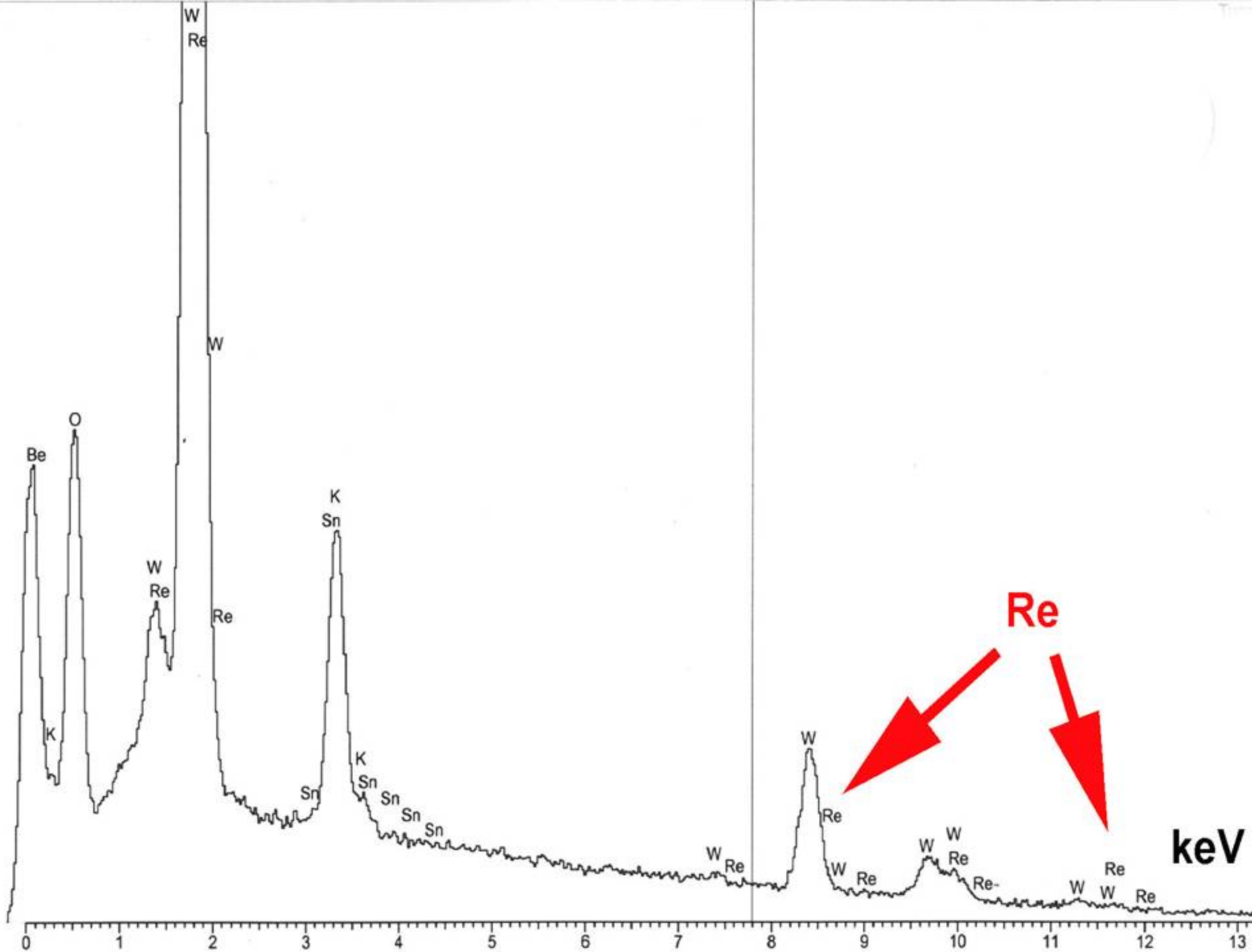


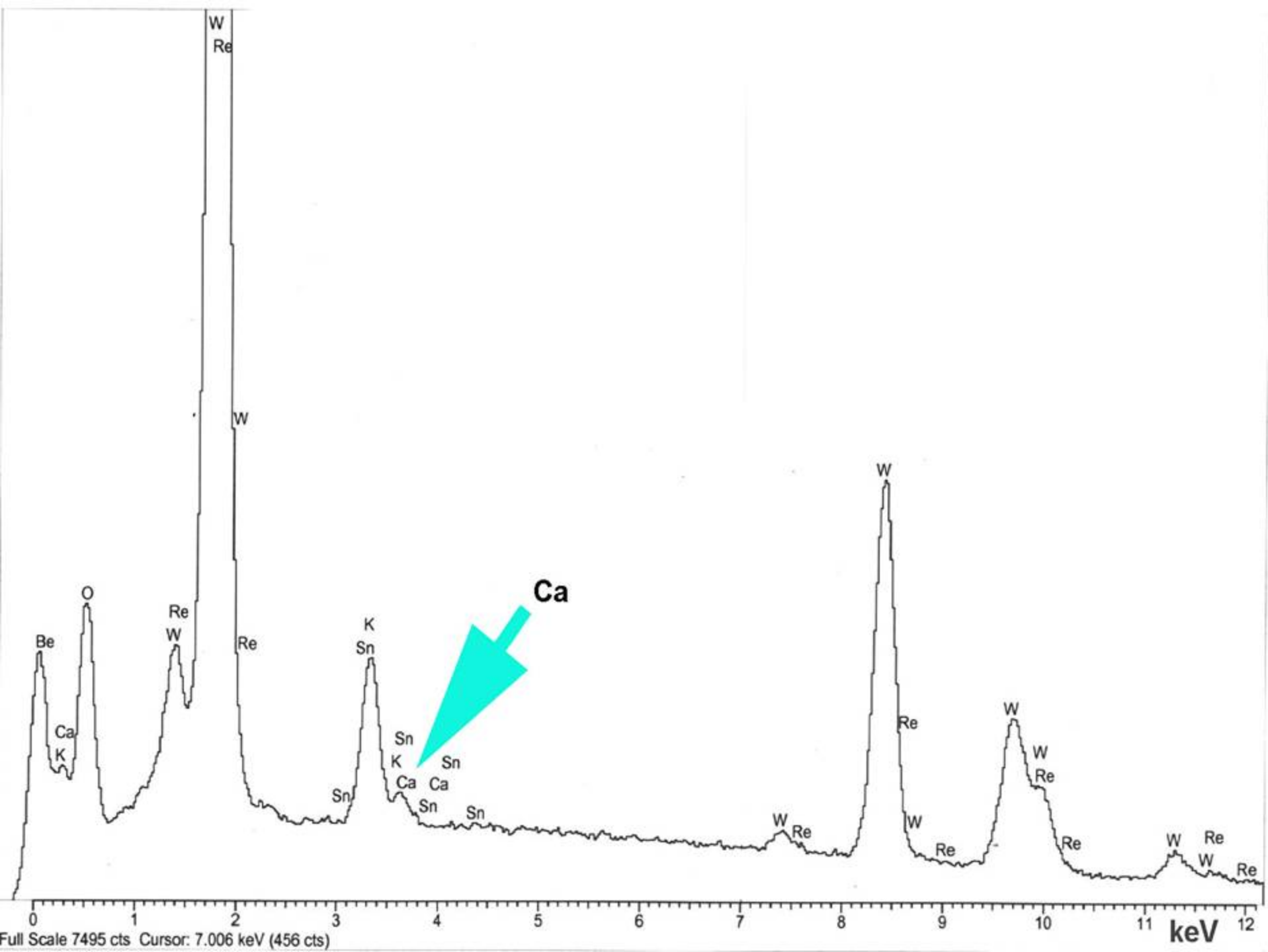
1 H 1.0079	20																2 He 4.0026																		
3 Li 6.941	4 Be 9.012	12 13										5 B 10.81	6 C 12.011	7 N 14.007	8 O 15.999	9 F 18.998	10 Ne 20.180																		
11 Na 22.99	12 Mg 24.305	13 Al 26.98	14 Si 28.086	15 P 30.97	16 S 32.066	17 Cl 35.453	18 Ar 39.948	20										19 K 39.09	20 Ca 40.078	21 Sc 44.95	22 Ti 47.86	23 V 50.94	24 Cr 51.996	25 Mn 54.938	26 Fe 55.84	27 Co 58.93	28 Ni 58.69	29 Cu 63.54	30 Zn 65.39	31 Ga 69.7	32 Ge 72.64	33 As 74.92	34 Se 78.96	35 Br 79.904	36 Kr 83.8
37 Rb 85.46	38 Sr 87.62	39 Y 88.906	40 Zr 91.22	41 Nb 92.906	42 Mo 95.94	43 Tc (98)	44 Ru 101.07	45 Rh 102.91	46 Pd 106.42	47 Ag 107.87	48 Cd 112.41	49 In 114.82	50 Sn 118.71	51 Sb 121.76	52 Te 127.6	53 I 126.90	54 Xe 131.29	30 32																	
55 Cs 132.91	56 Ba 137.33	57-71 La-Lu	72 Hf 178.49	73 Ta 180.95	74 W 183.84	75 Re 186.21	76 Os 190.2	77 Ir 192.2	78 Pt 195.08	79 Au 196.97	80 Hg 200.59	81 Tl 204.3	82 Pb 207.2	83 Bi 208.98	84 Po (209)	85 At (210)	86 Rn (222)	34 36 38																	
87 Fr (223)	88 Ra (226)	89-103 Ac-Lr	104 Rf (261)	105 Db (262)	106 Sg (266)	107 Bh (264)	108 Hs (277)	109 Mt (268)	110 Ds (281)	111 Uuu (272)	112 Uub (285)	114 Uuq (289)	115 Uup	60 62																					
																	112 110		118 120		122		70 79 78												

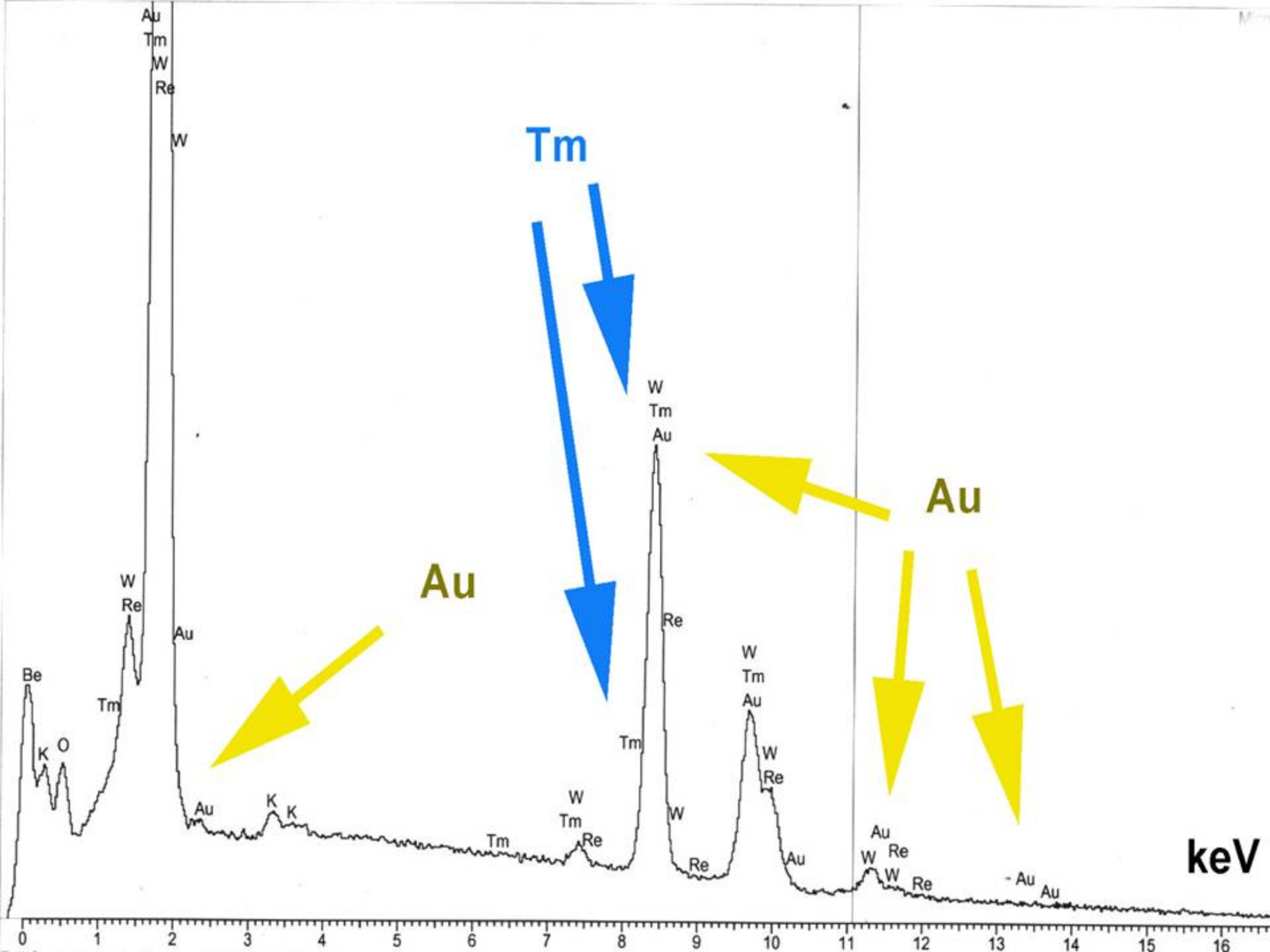
LANTANIDI	57	58	59	60	61	62	63	64	65	66	67	68	69	70	71
	La	Ce	Pr	Nd	Pm	Sm	Eu	Gd	Tb	Dy	Ho	Er	Tm	Yb	Lu
	138.91	140.12	140.91	144.24	(145)	150.36	151.96	157.25	158.93	162.50	164.93	167.26	168.93	173.04	174.97
ATTINIDI	89	90	91	92	93	94	95	96	97	98	99	100	101	102	103
	Ac	Th	Pa	U	Np	Pu	Am	Cm	Bk	Cf	Es	Fm	Md	No	Lr
	(227)	232.04	231.04	238.03	(237)	(244)	(243)	(247)	(247)	(251)	(252)	(257)	(258)	(259)	(262)

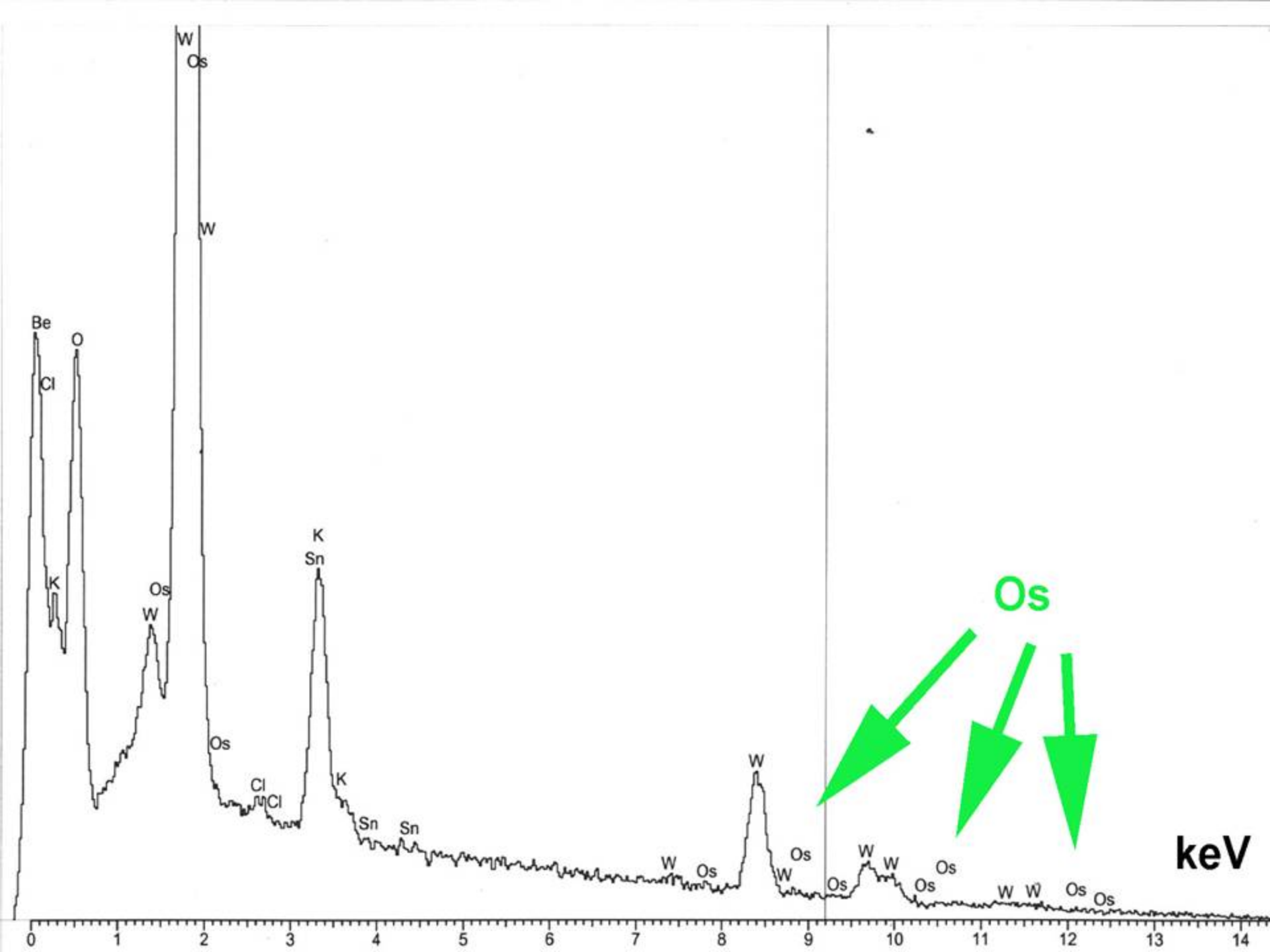


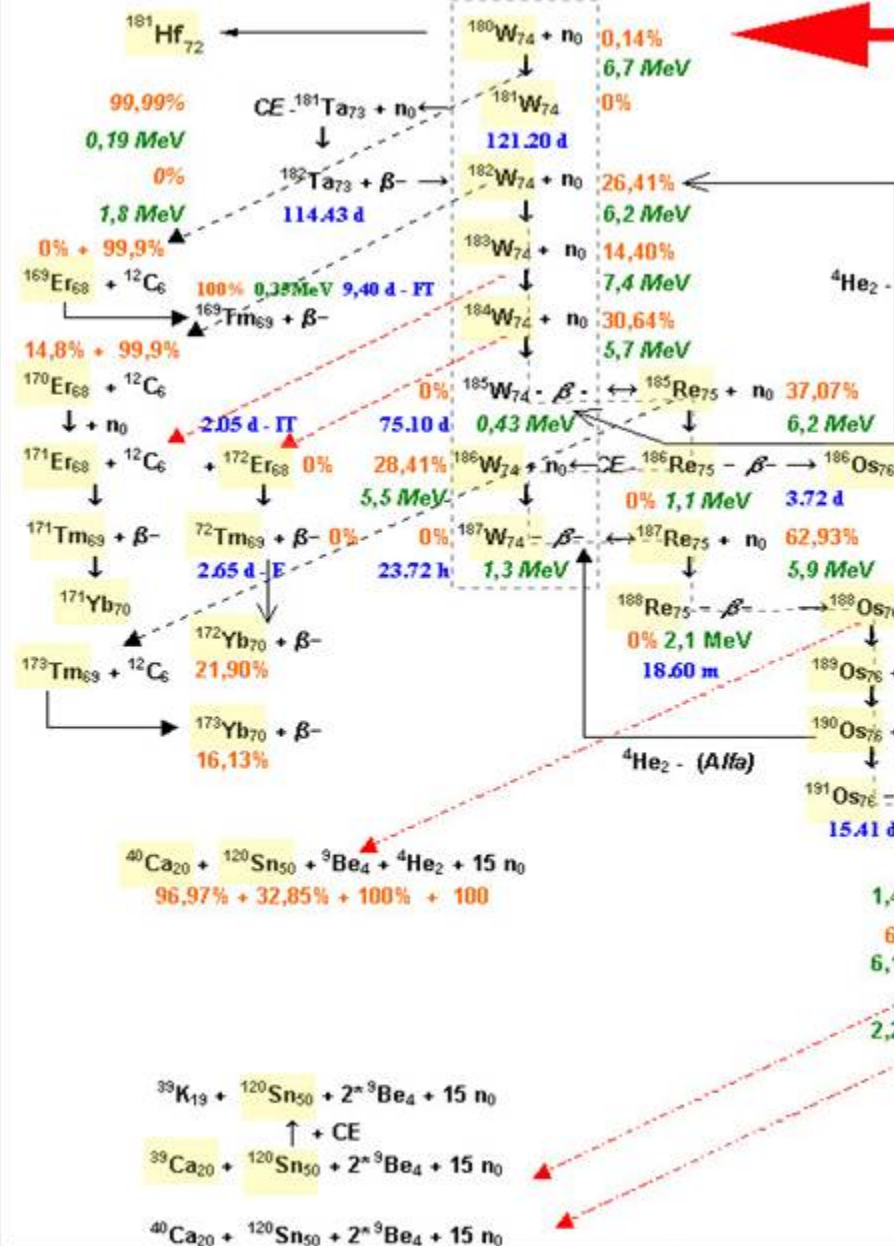
64	65	66	67	68	69	70	71	72	73	74	75	76	77	78	79	80	81
Gd	Tb	Dy	Ho	Er	Tm	Yb	Lu	Hf	Ta	W	Re	Os	Ir	Pt	Au	Hg	Tl
157.25	158.93	162.50	164.93	167.26	168.93	173.04	174.97	178.49	180.95	183.84	186.21	190.2	192.2	195.08	196.97	200.59	204.3



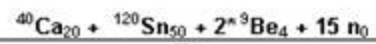
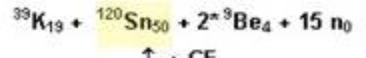




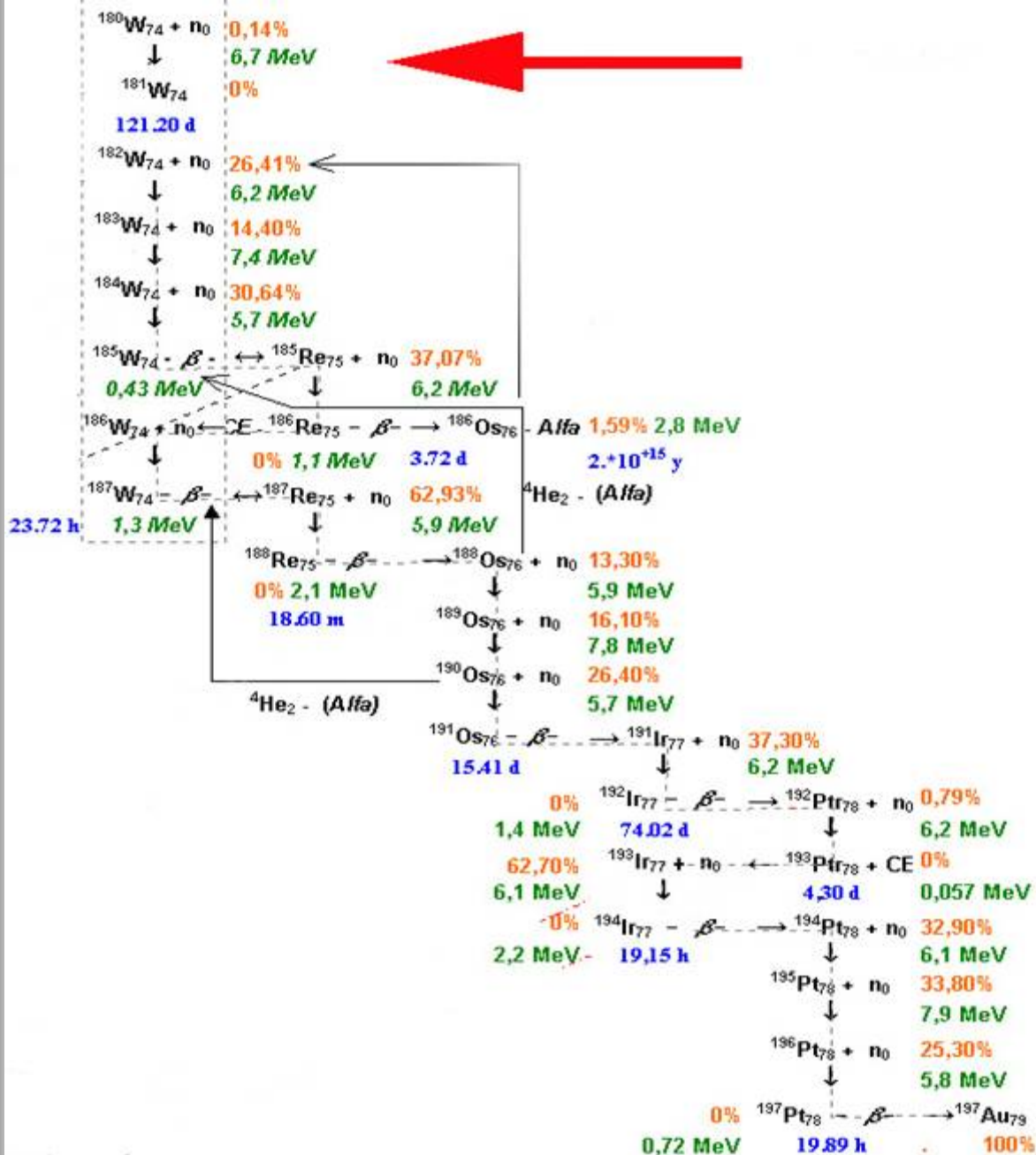




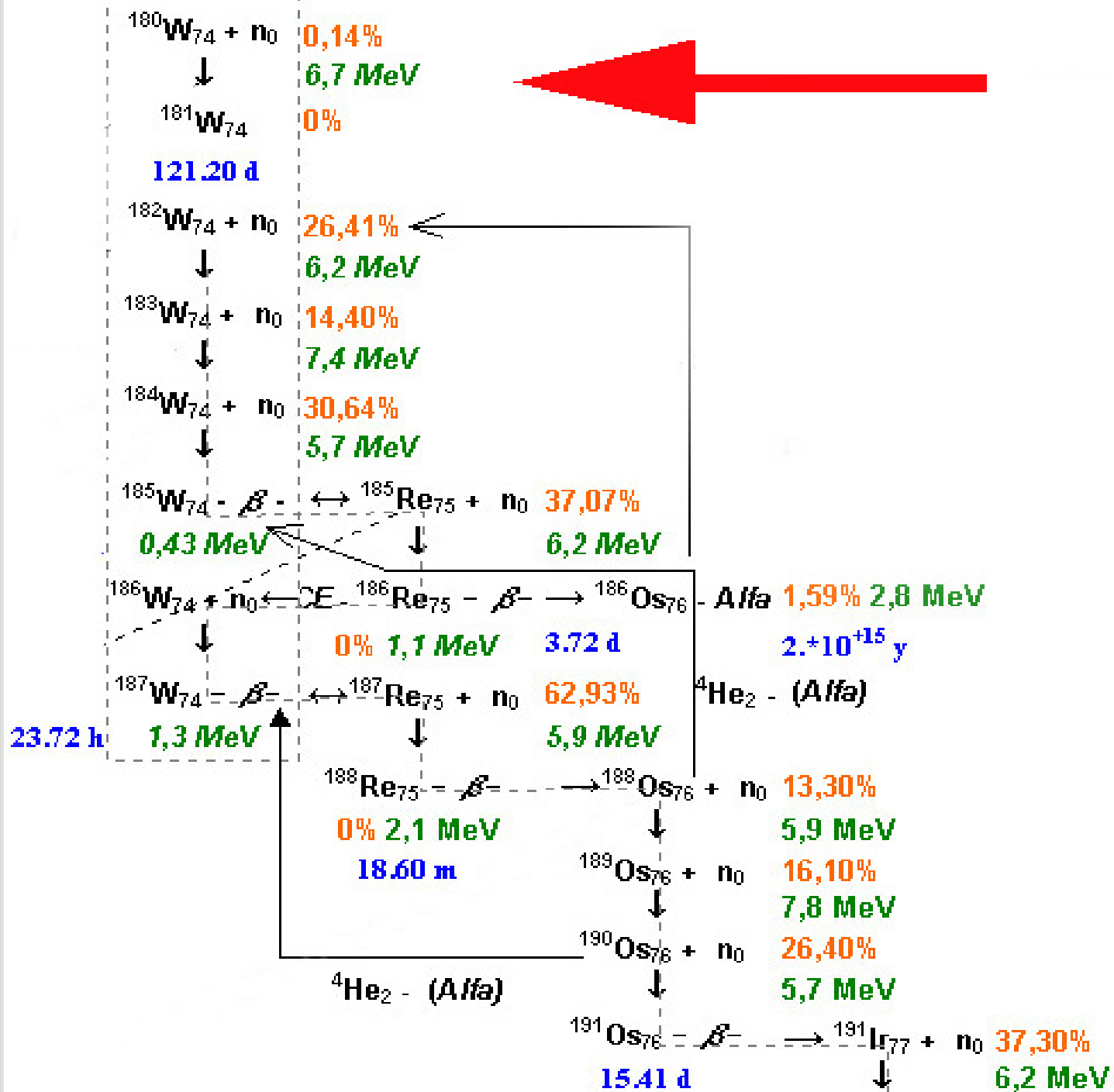
- FT - Fast neutron activation - Thermal neutron activation
- PFT - Photon Reaction - Fast neutron activation - Thermal neutron activation
- F - Fast neutron activation
- CF - Charged particle reaction - Fast neutron activation
- CFT - Charged particle reaction - Fast and Thermal neutron activation
- C - Charged particle reaction
- N - Naturally occurring isotope
- NI - Naturally occurring isotope - Fission product
- II - Fission product - Thermal neutron activation

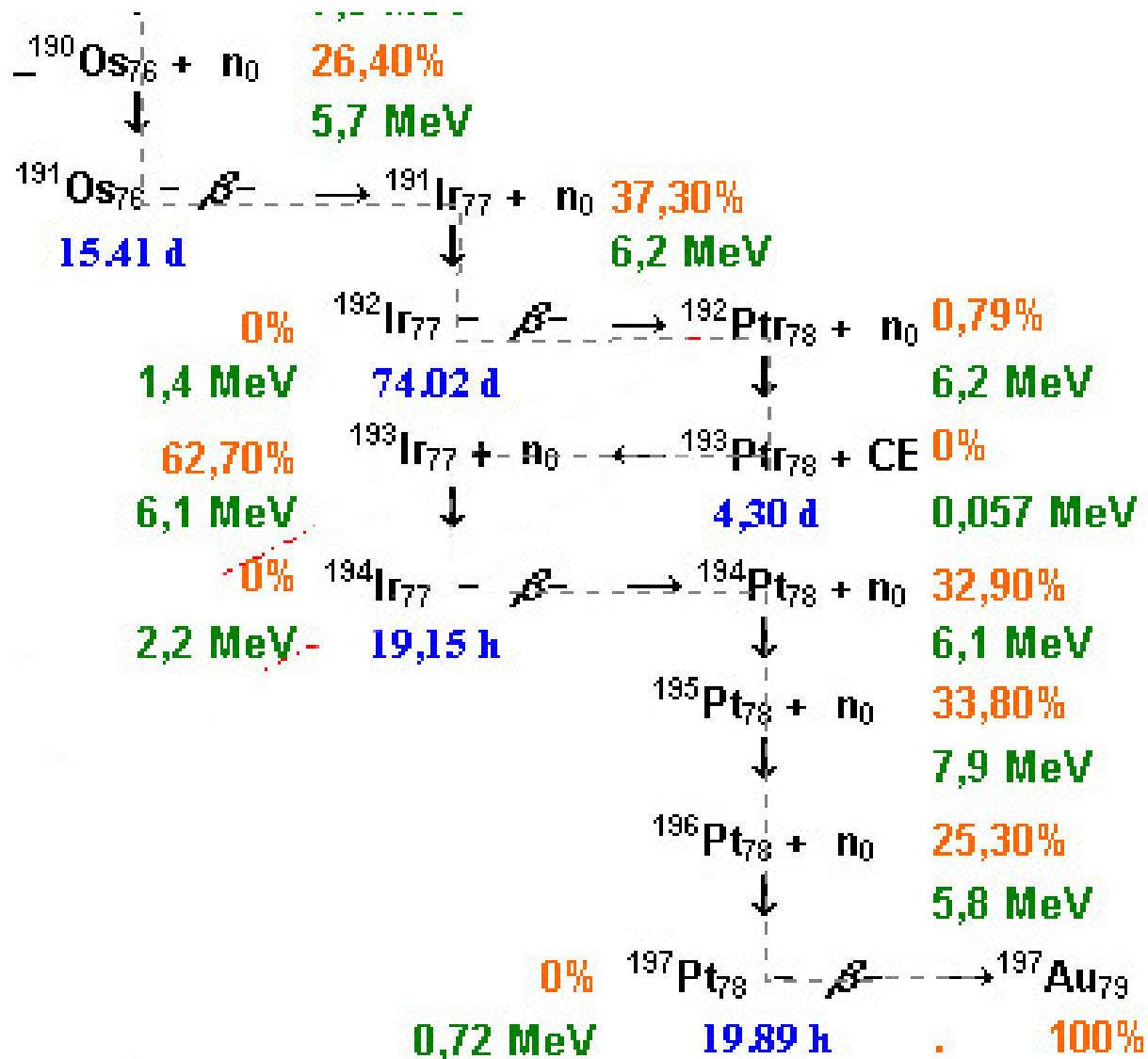


Hf 72 Hafnio 5400°C	Ta 73 Tantalio 5429°C	W 74 Tungsteno 5927°C	Re 75 Renio 5630°C	Os 76 Osmio 5500°C	Ir 77 Iridio 4500°C	Pt 78 Platino 3827°C	Au 79 Oro 2808°C	totale n ₀ =17 β ⁻ , γ=10 e ⁻ =3
------------------------------	--------------------------------	--------------------------------	-----------------------------	-----------------------------	------------------------------	-------------------------------	---------------------------	--



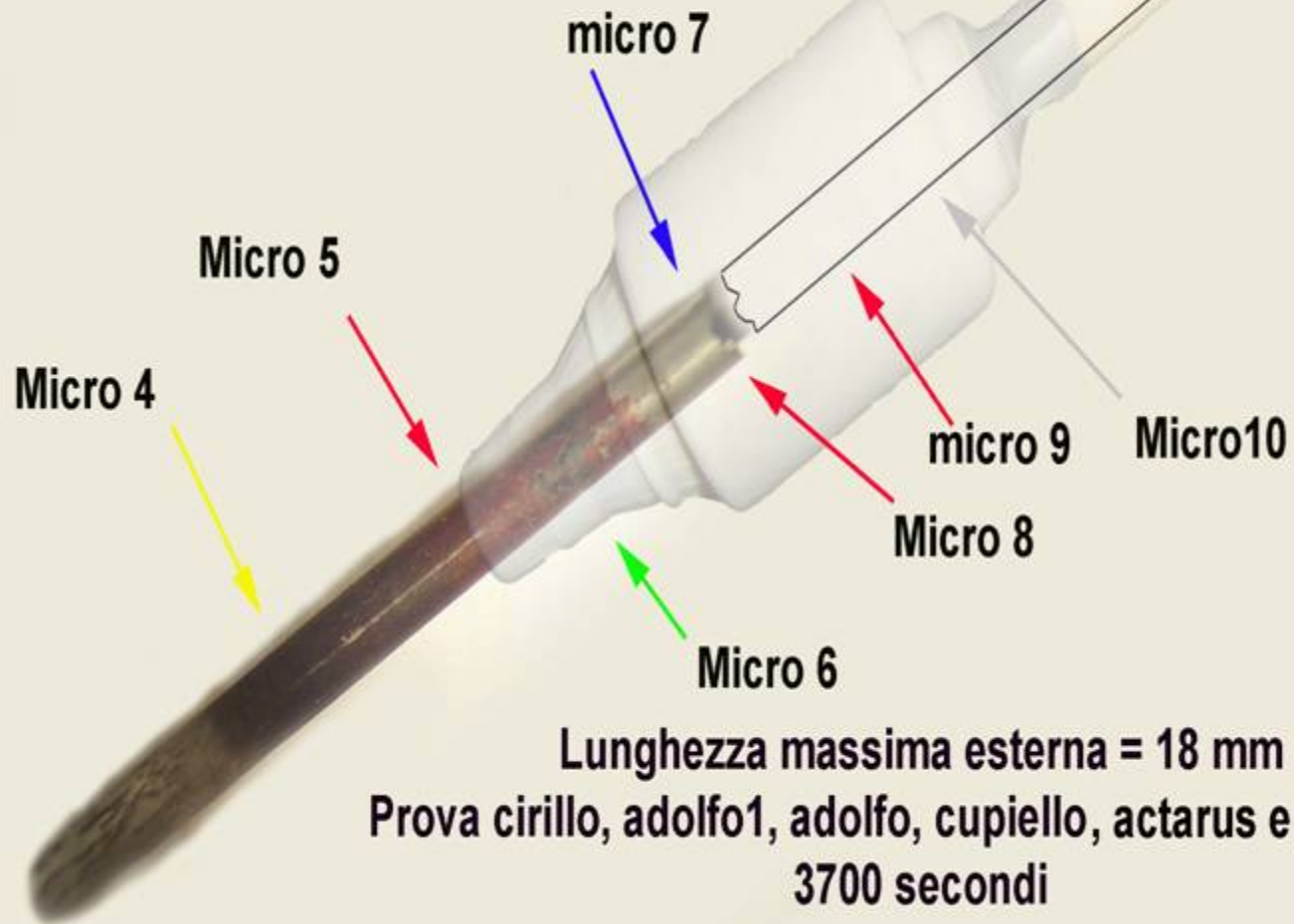
W	Re	Os	Ir	Pt	Au
74	75	76	77	78	79
Tungsteno	Renio	Osmio	Iridio	Platino	Oro
5927°C	5630°C	5500°C	4500°C	3827°C	2808°C





Os	Ir	Pt	Au
76	77	78	79
Osmio	Iridio	Platino	Oro
5500°C	4500°C	3827°C	2808°C

**Posizione relativa del copri-elettrodo
refrattario in ceramica**



Lunghezza massima esterna = 18 mm

**Prova cirillo, adolfo1, adolfo, cupiello, actarus e goldrake
3700 secondi**

- W
- Au Re Tm
- Re Sn Ca
- Re Yb Sn Ca
- Os
- Re

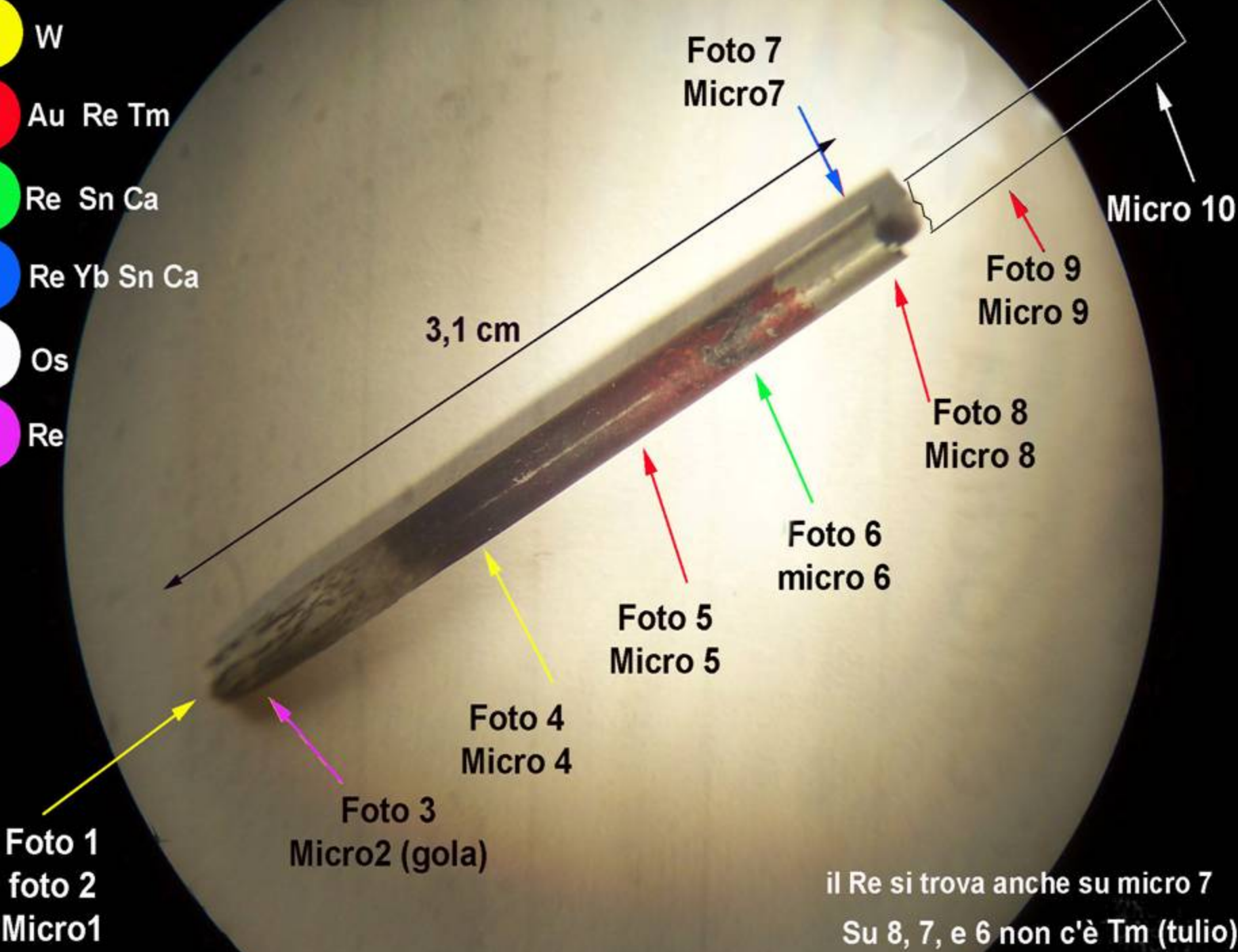


Foto 1
foto 2
Micro1

Foto 3
Micro2 (gola)

Foto 4
Micro 4

Foto 5
Micro 5

Foto 6
micro 6

Foto 8
Micro 8

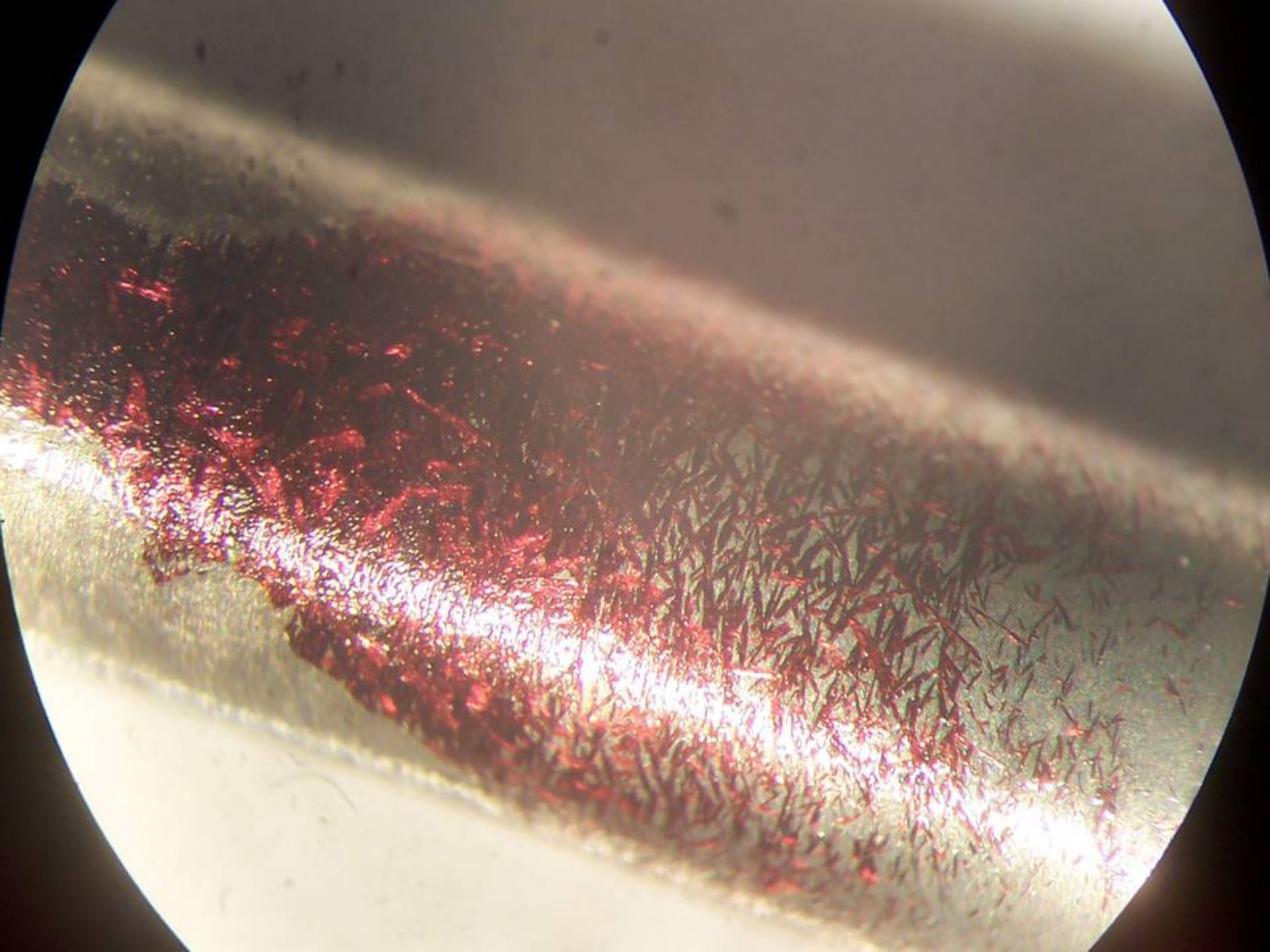
Foto 9
Micro 9

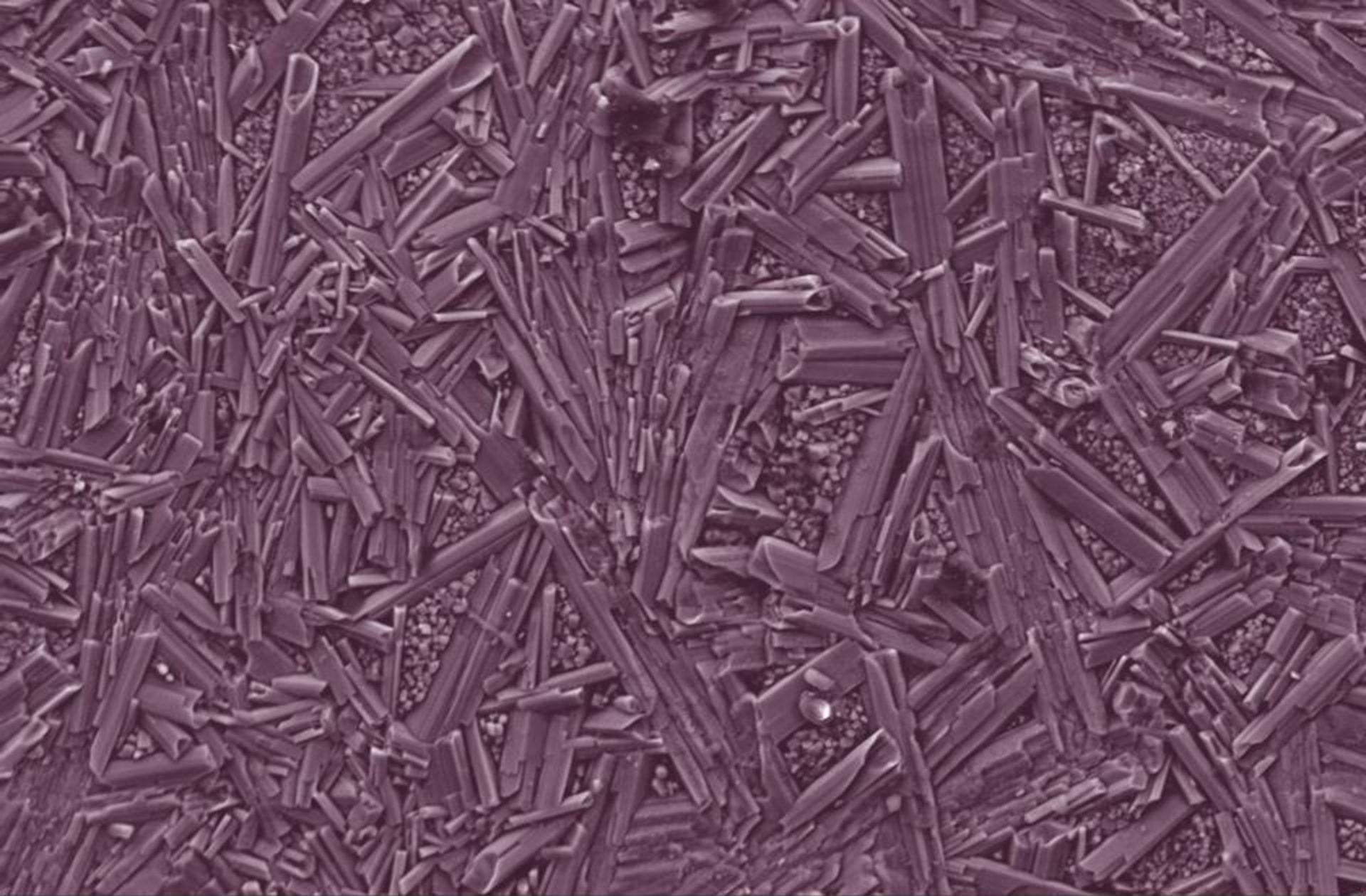
Foto 7
Micro7

Micro 10

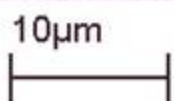
3,1 cm

il Re si trova anche su micro 7
Su 8, 7, e 6 non c'è Tm (tulio)





Mag = 965 X



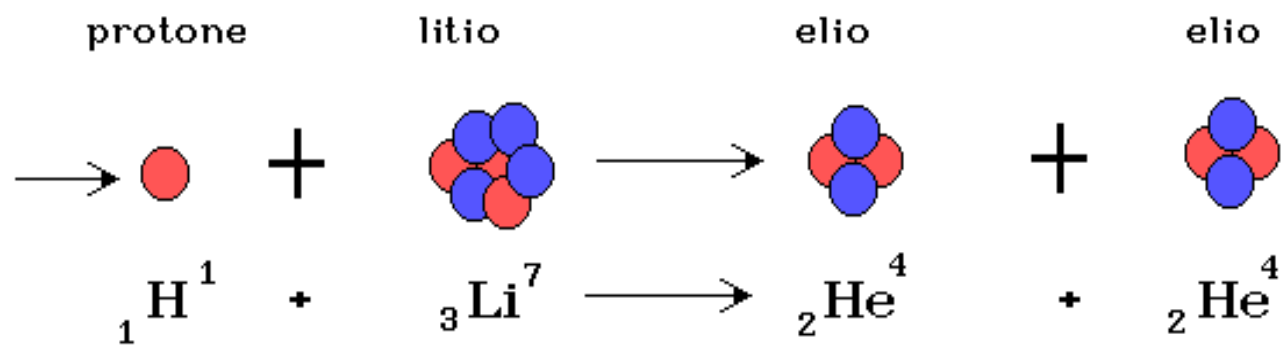
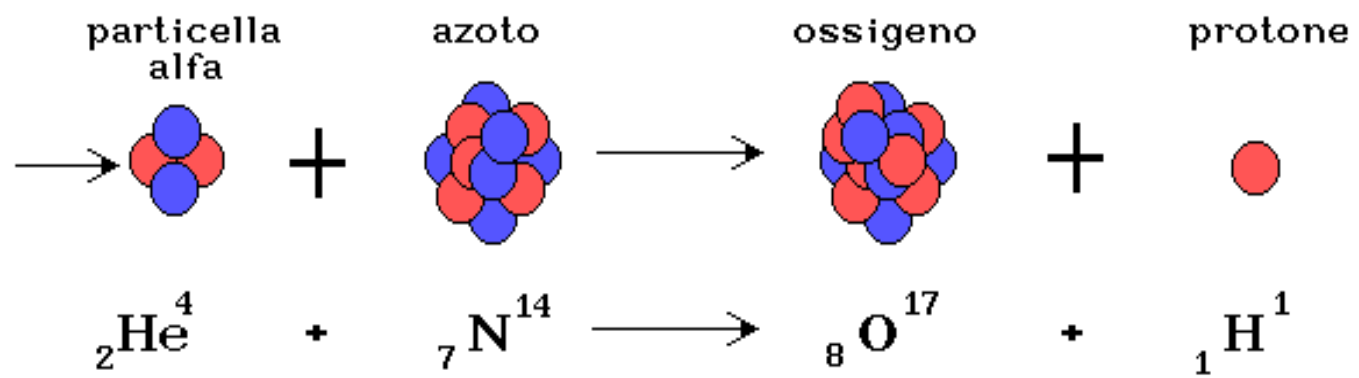
EHT = 15.00 kV
WD = 14 mm

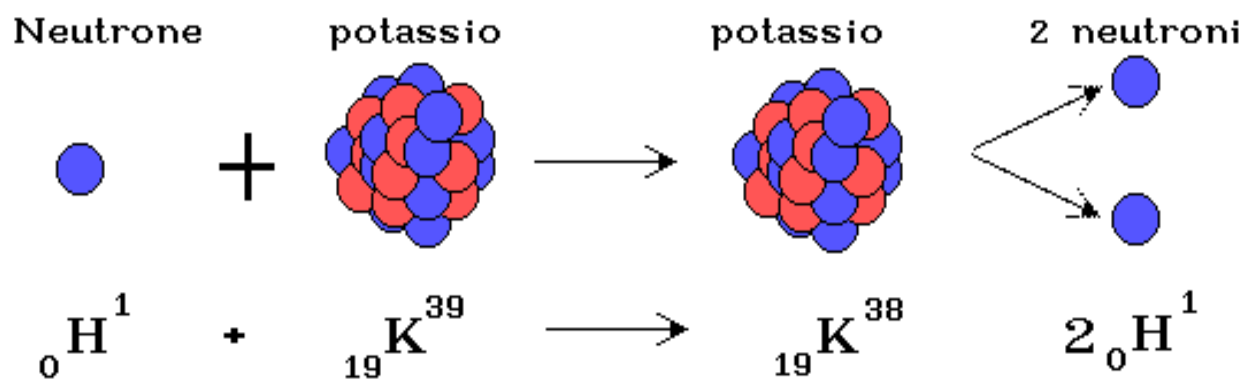
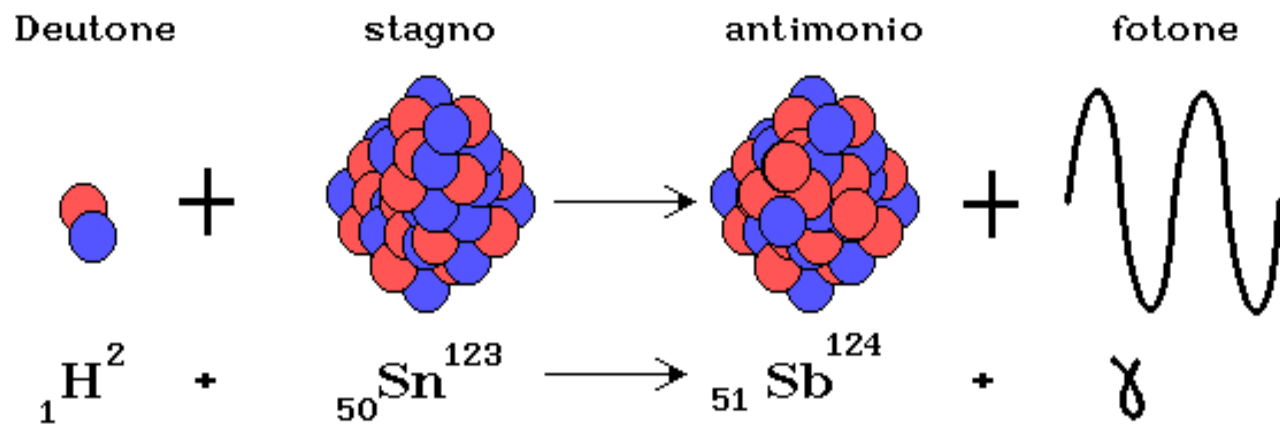
Signal A = SE2
Photo No. = 317

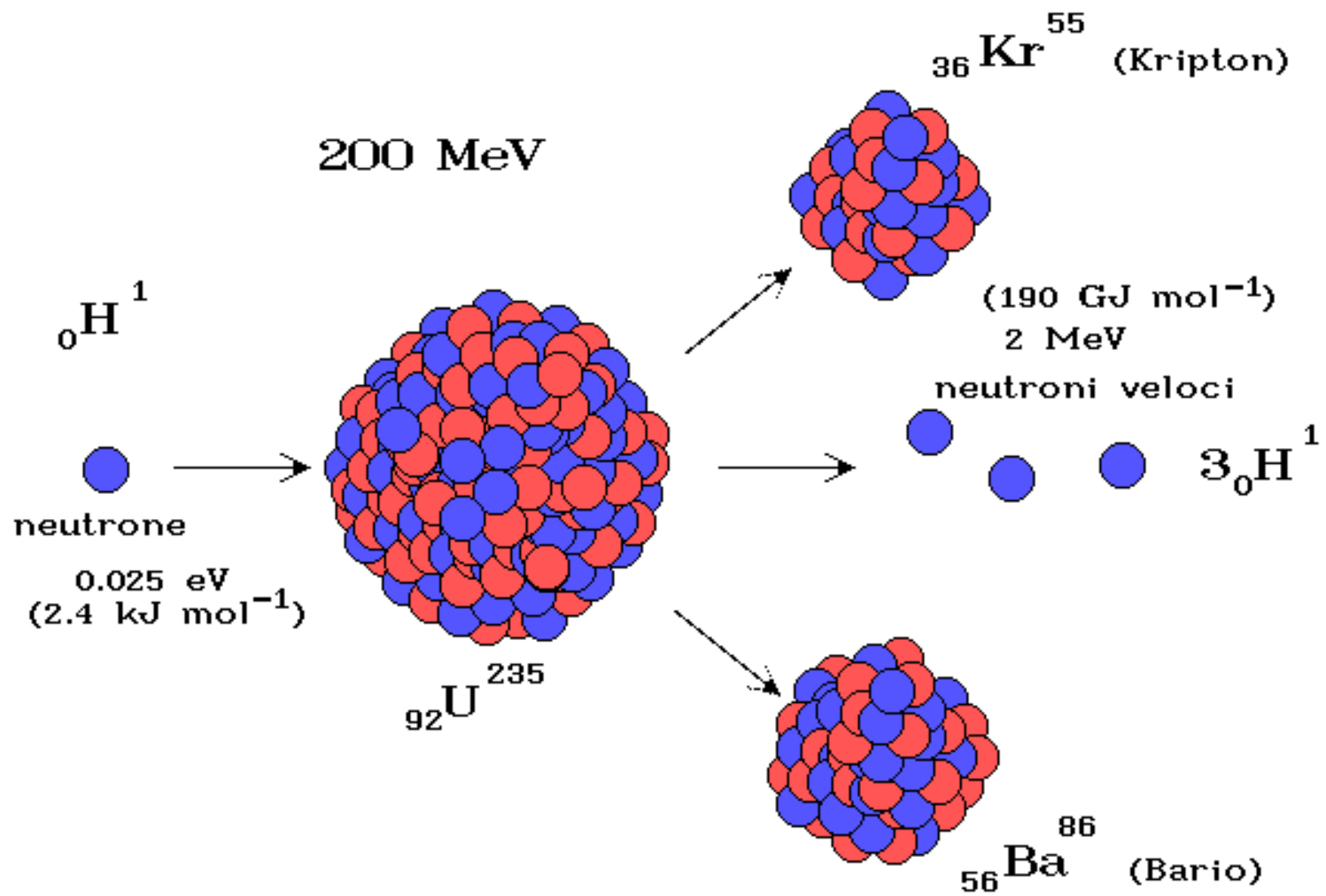
Date :26 Jan 2004
Time :14:54:20



FINE







Dati termodinamici del Tungsteno

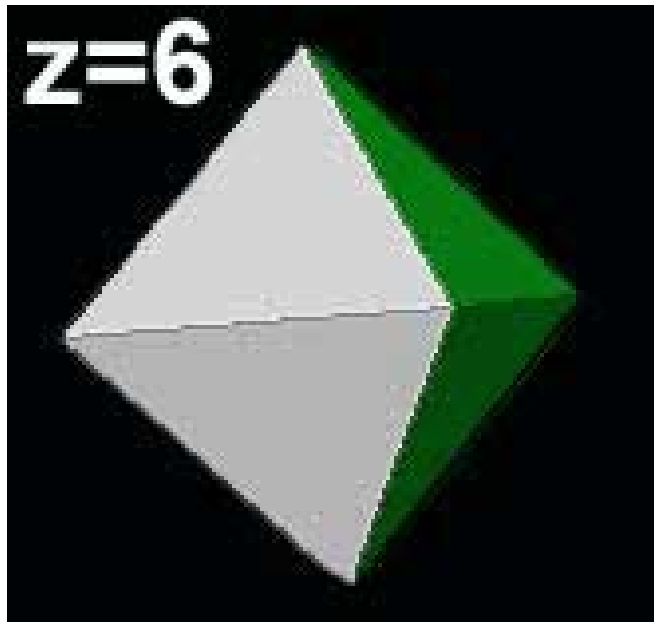
Calore di fusione = 193,44 J/g = 46,2 cal/g = 35,4 kJ/mole

Calore di vaporizzazione = 824 kJ/g = 1077,2 cal/g

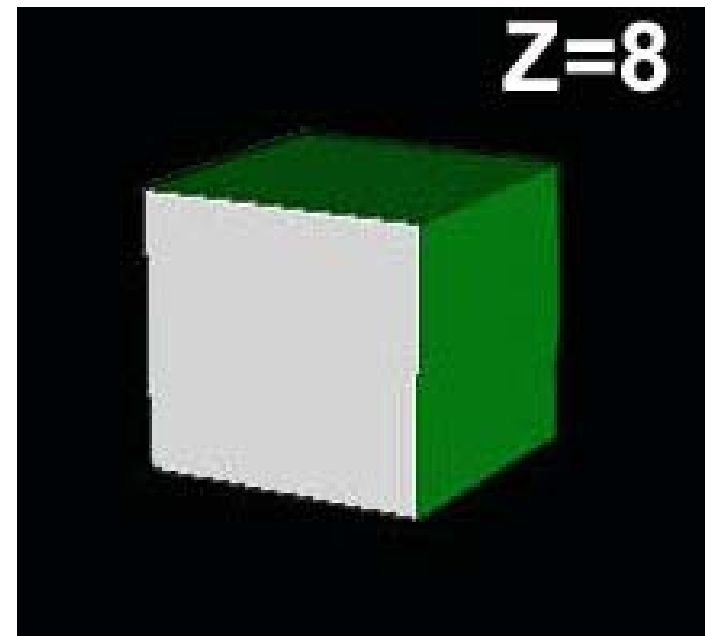
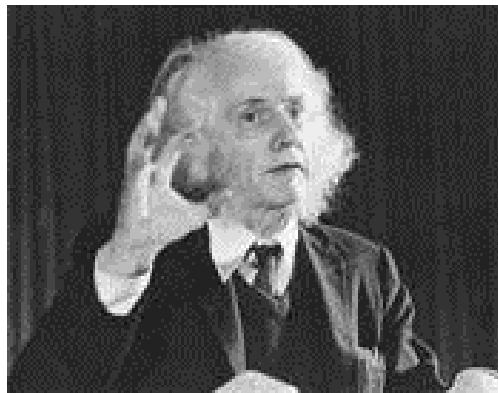
Calore specifico 0,133 J/g K = 0,0318 cal/g K

Calore di atomizzazione 849 kJ/mole

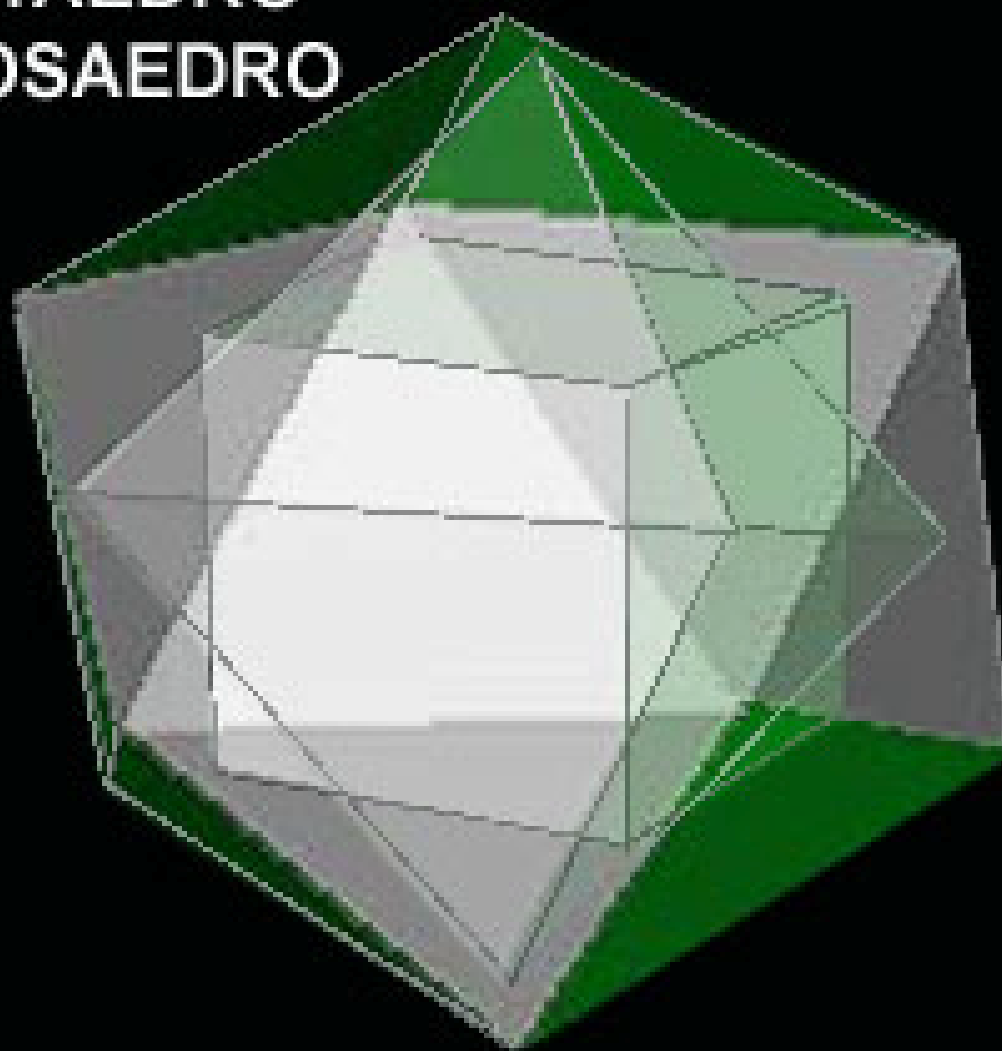


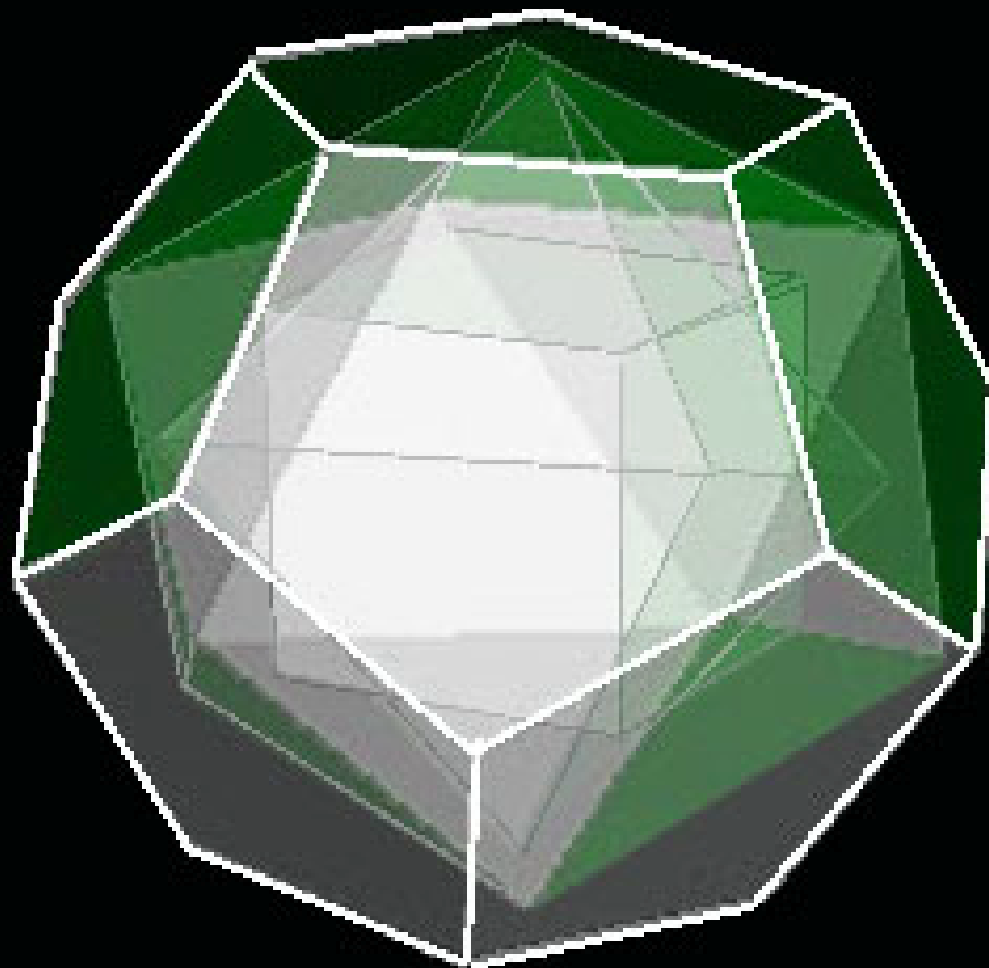


**Teoria di Robert J. Moon
Università di Chicago 1986**



CUBO
OTTAEDRO
ICOSAEDRO

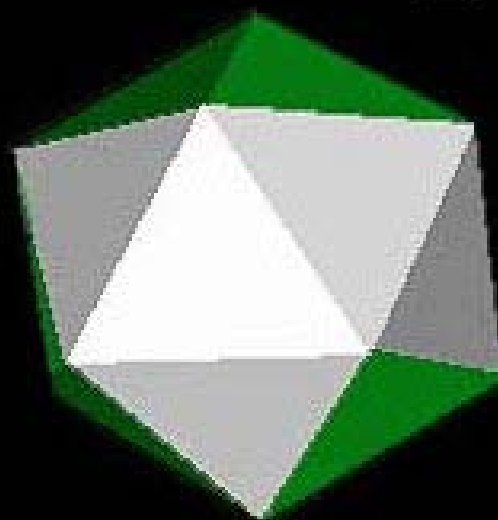


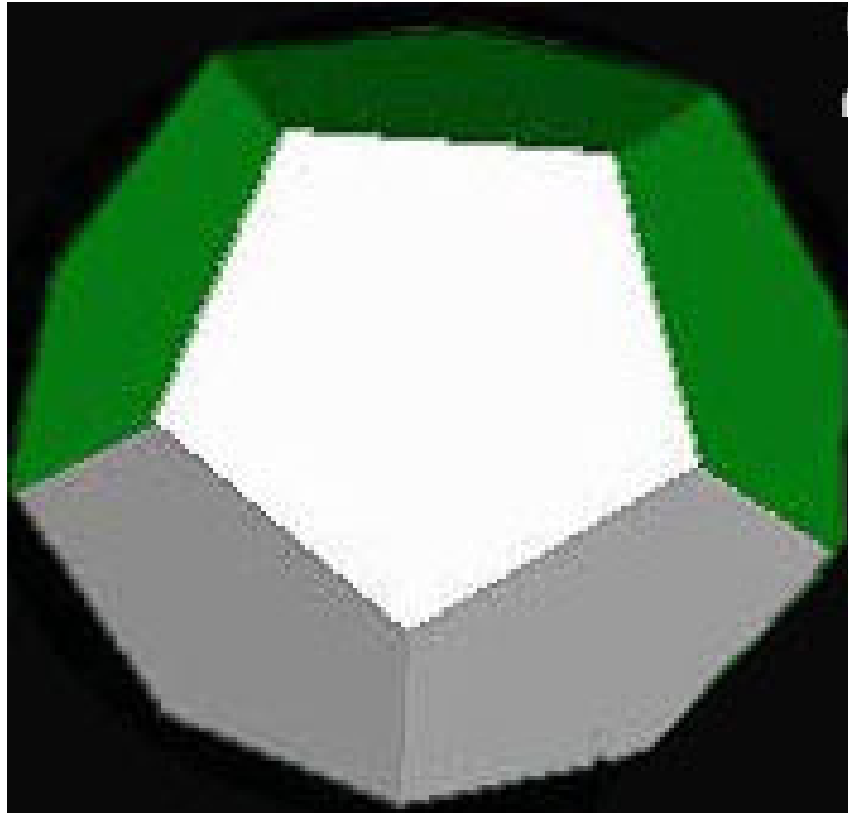


$Z=14$



$Z=26$

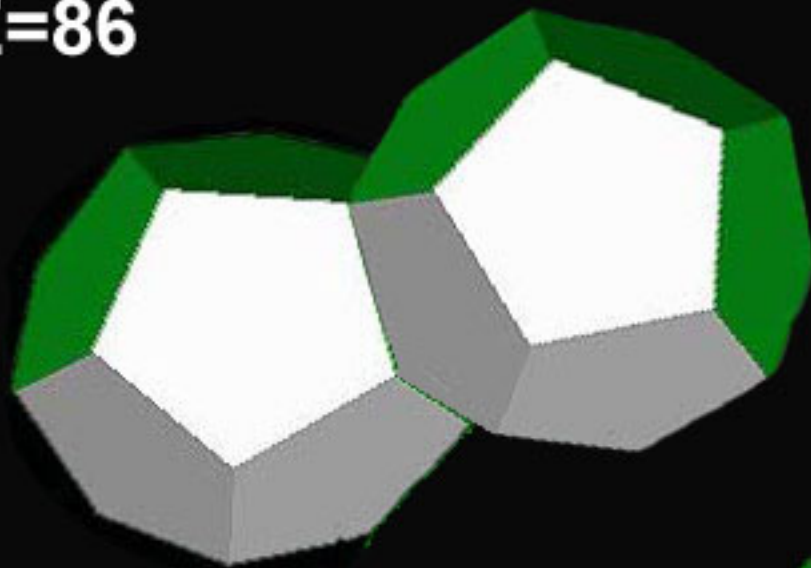




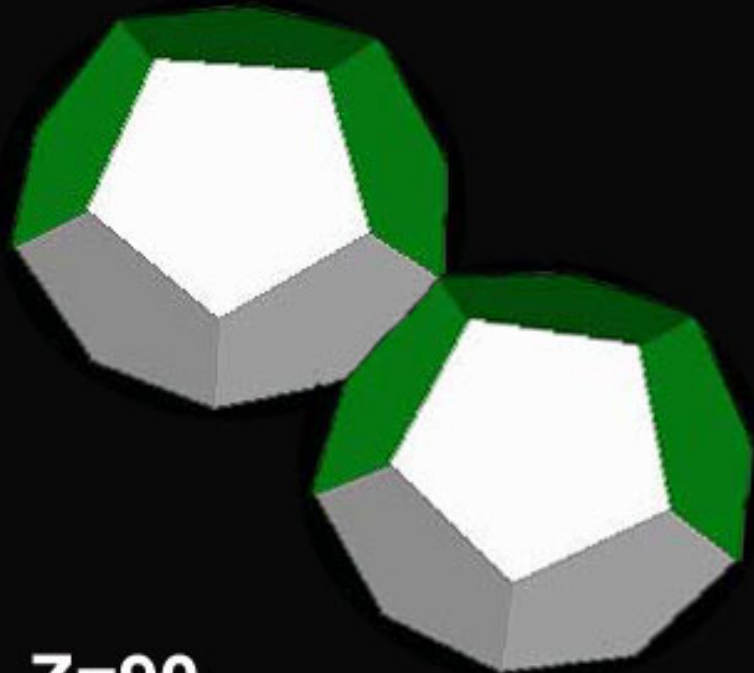
$Z=46$

Palladio

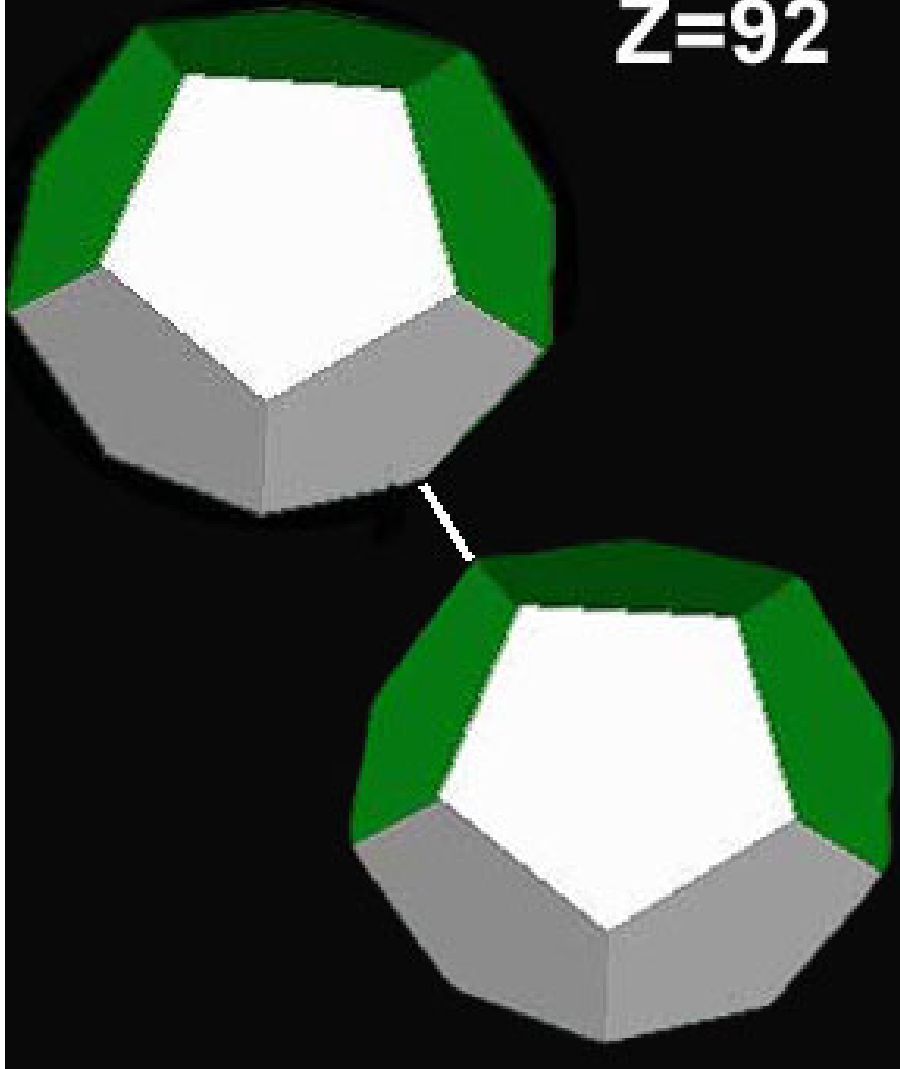
Z=86

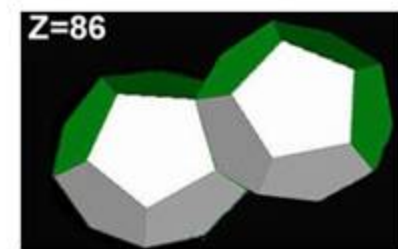
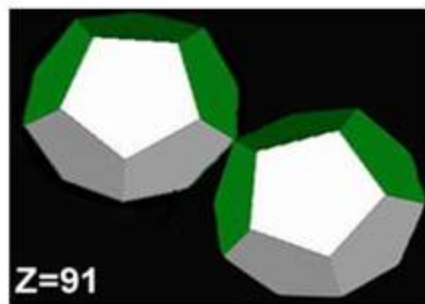
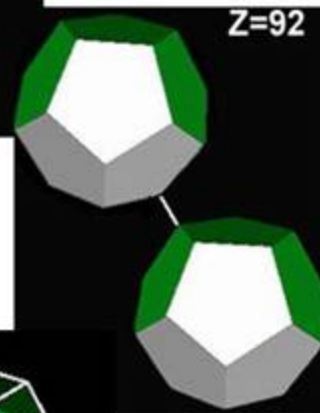
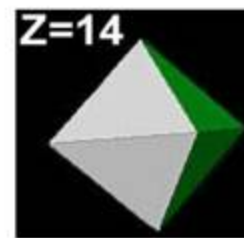
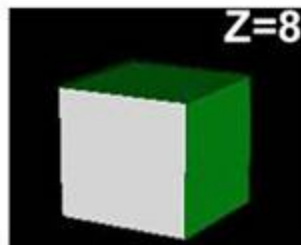
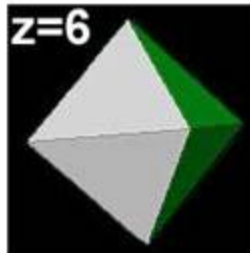


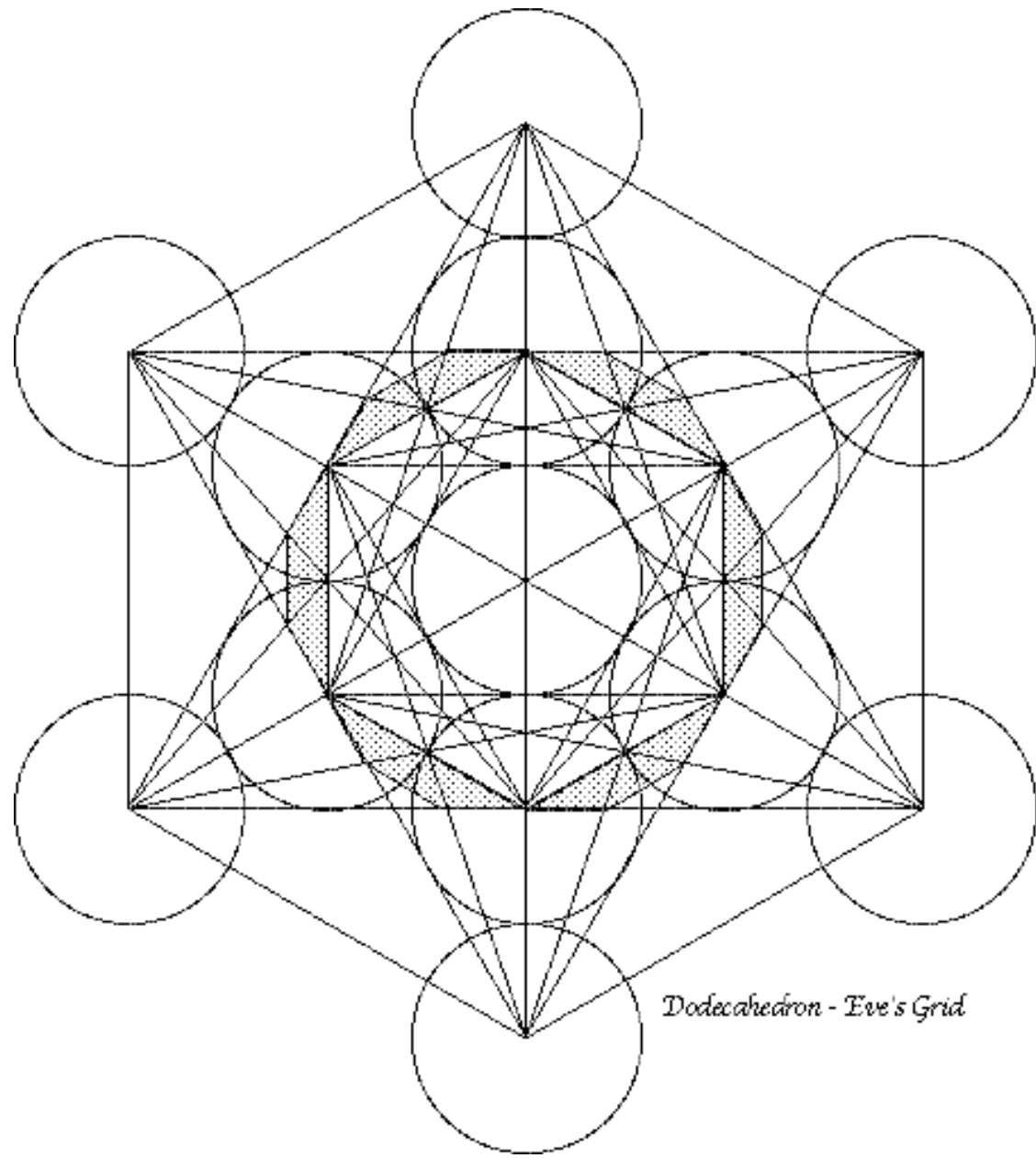
Z=90



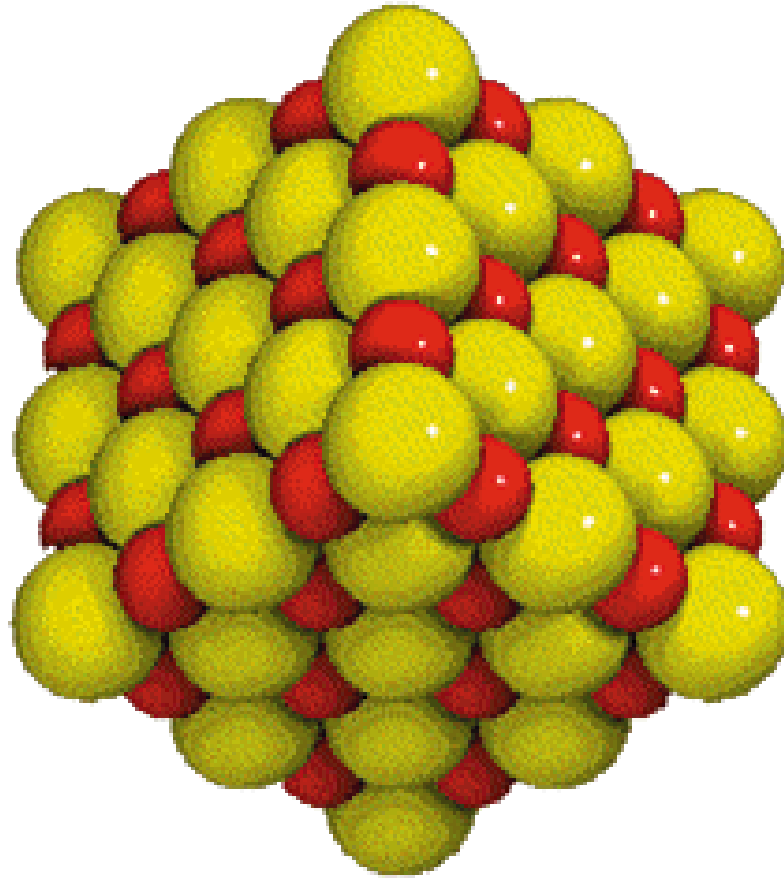
$Z=92$

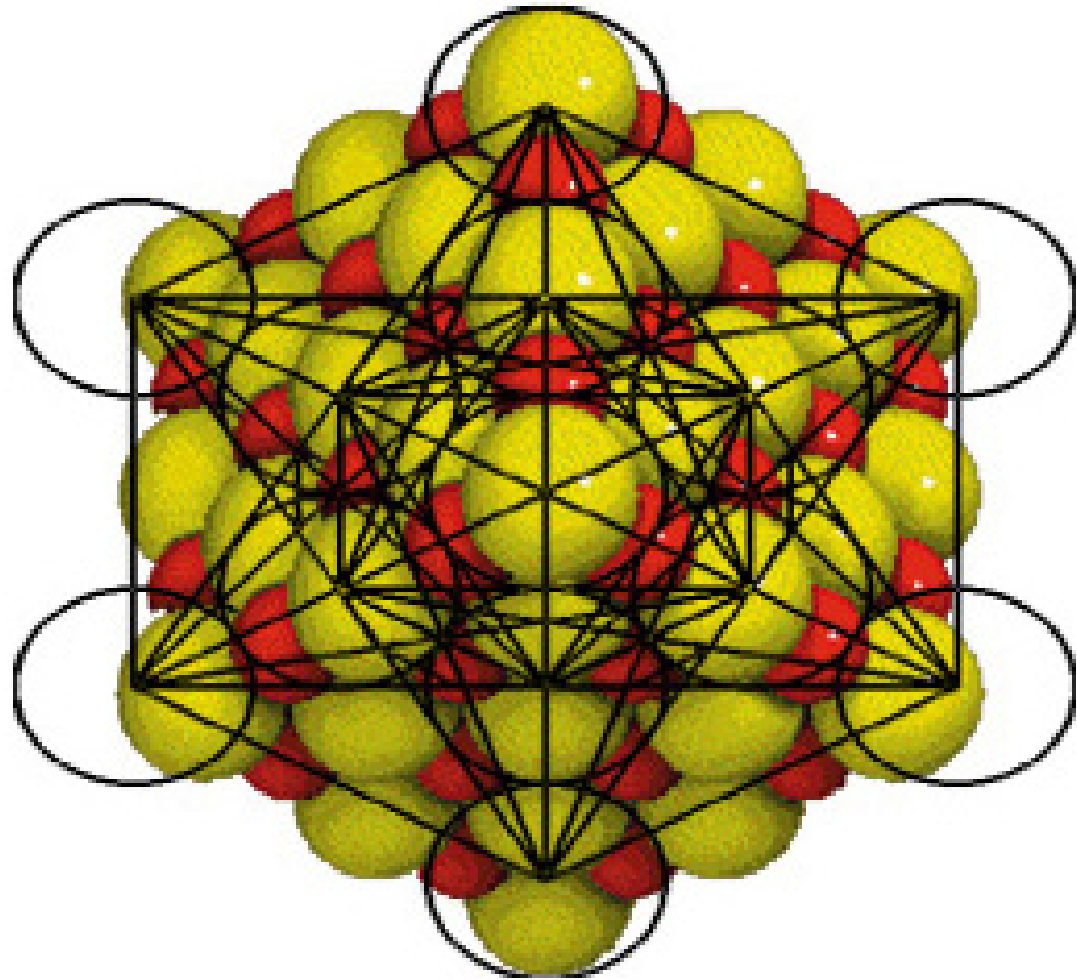


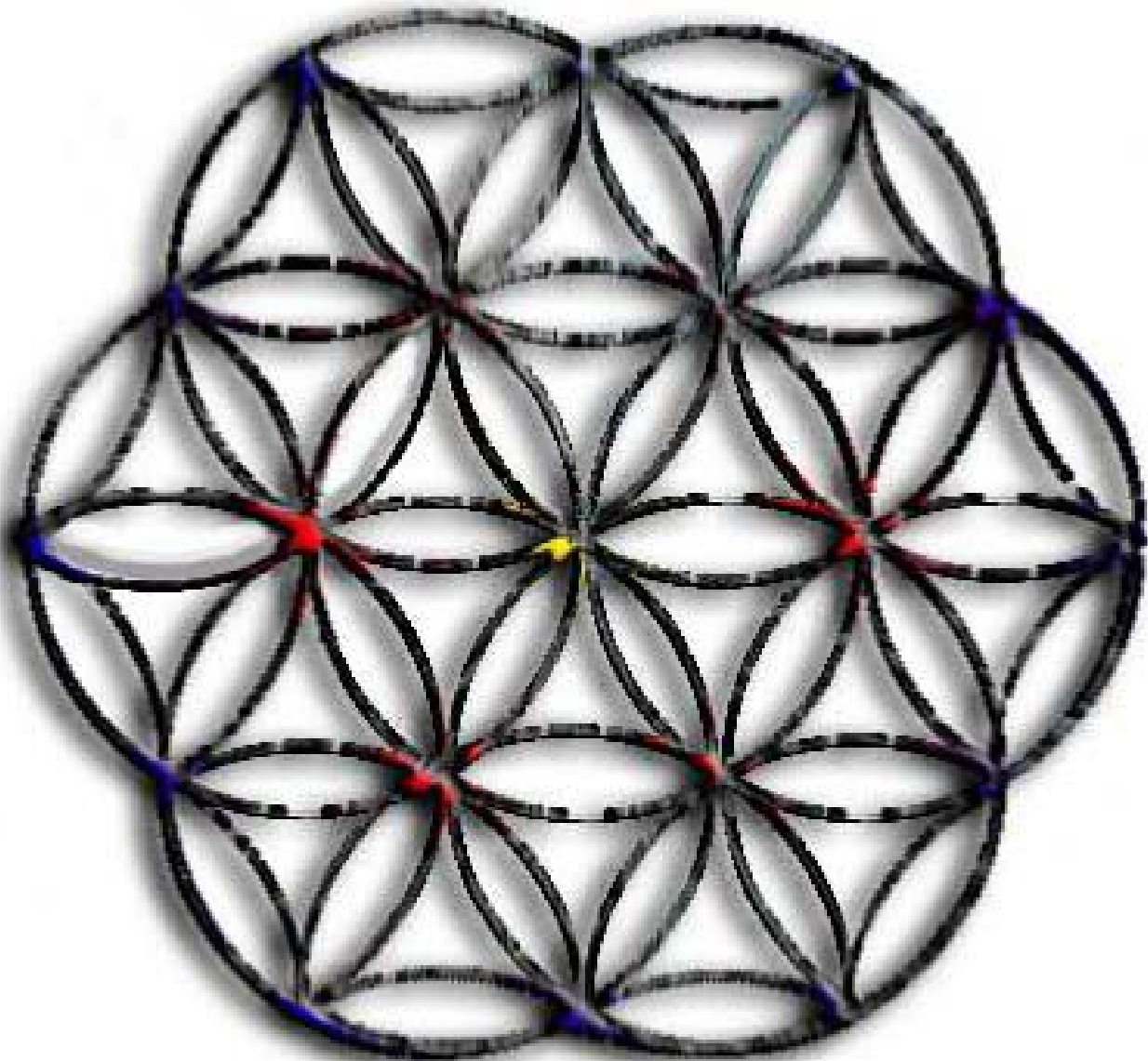




Dodecahedron - Eve's Grid







Quarks

u

up

c

charm

t

top

d

down

s

strange

b

bottom

Leptons

ν_e

e- neutrino

ν_μ

μ - neutrino

ν_τ

τ - neutrino

e

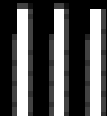
electron

μ

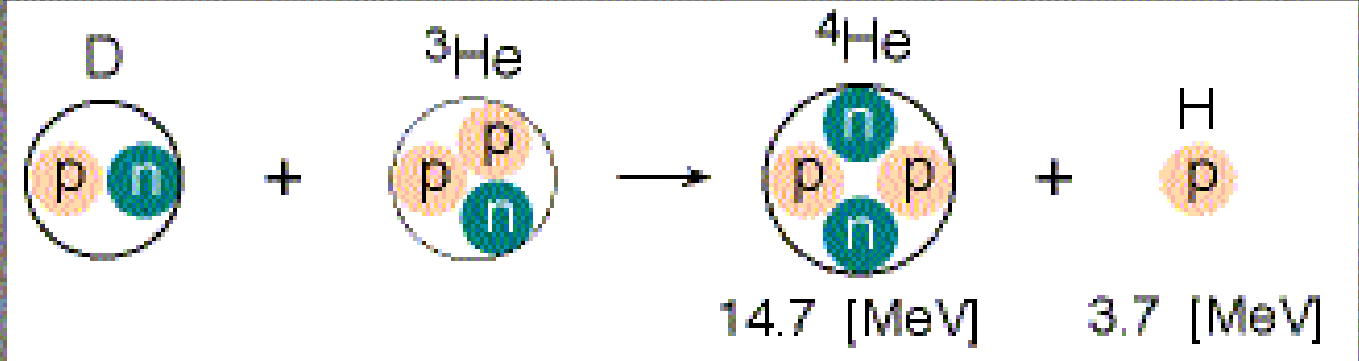
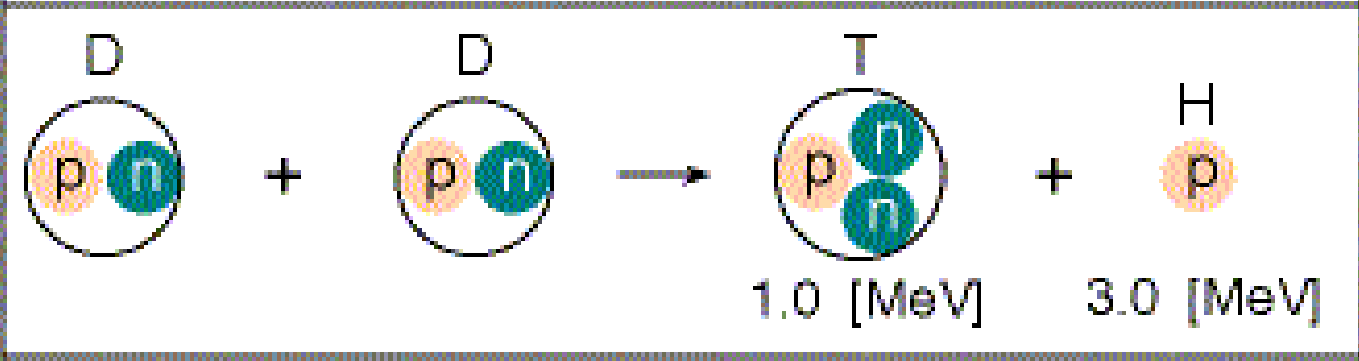
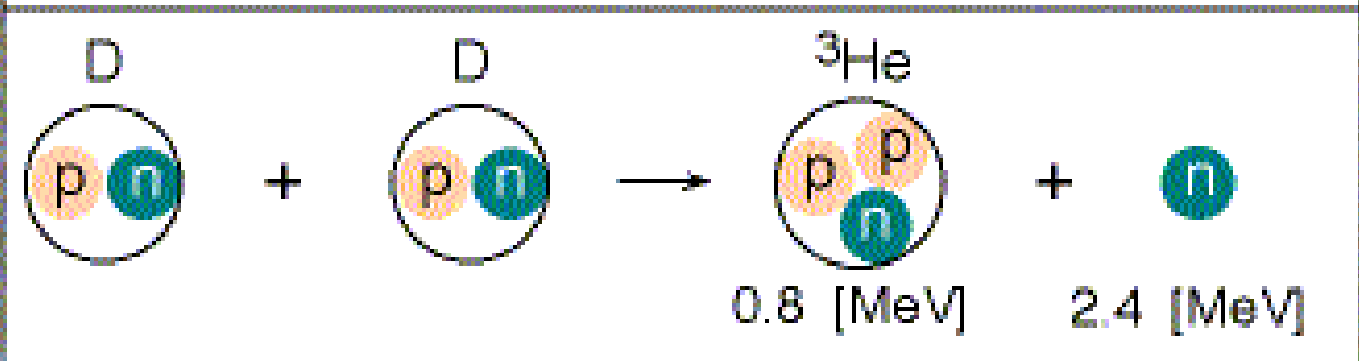
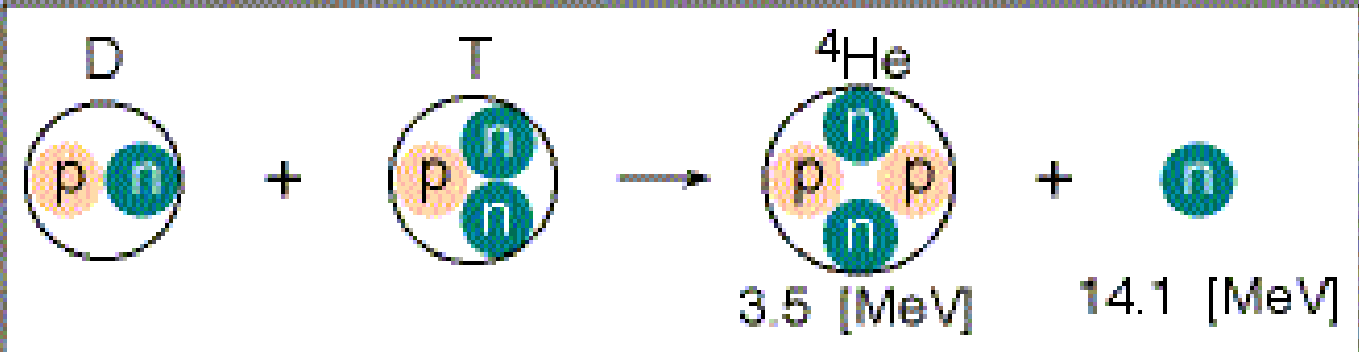
muon

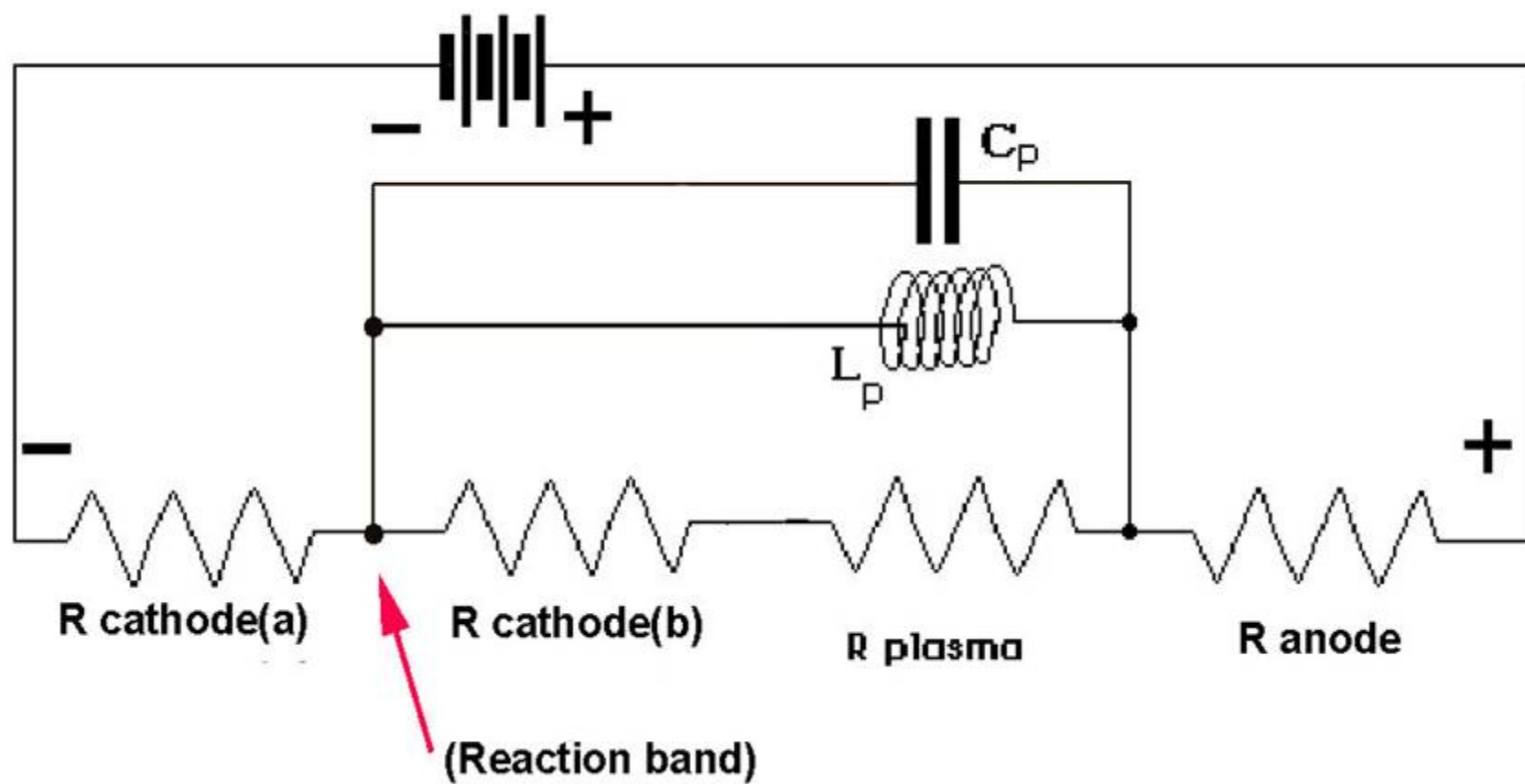
τ

tau

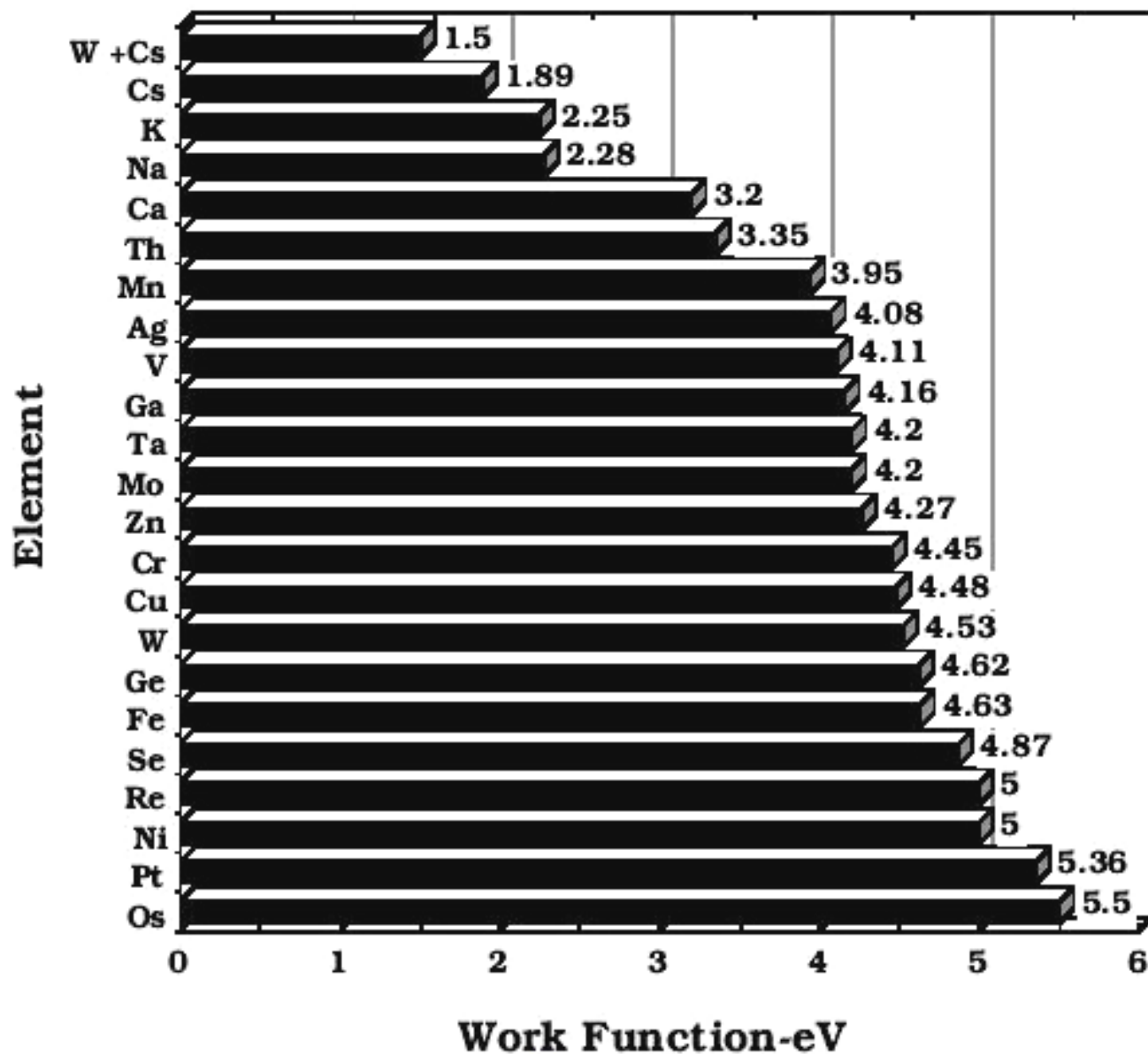


Three Generations of Matter





Work Function Values for Metallic Elements



EMISSIONE TERMOELETTRONICA (Dushman-Richardson)

$$I_e = A_0 \cdot S \cdot T^2 \cdot e^{-\frac{b_0}{T}}$$

$$b_0 = \frac{eE_w \cdot f(V_a)}{k} \qquad A_0 = \frac{4 \cdot \pi \cdot m \cdot e \cdot k^2}{h^3}$$

e = carica elettrica elettrone, E_w = work-function (energia di ionizzazione), k = costante di Boltzman, h = costante di Planck
 $f(V_a)$ = funzione della tensione (in alcuni casi si puo' trascurare)

Materiale	A_0 A/m ² °K ² 10 ⁴	b_0	E_w	°K
carbonio	60,2	54500	4,7	3970
cesio	16,2	21000	1.89	301
molibdeno	60,2	49900	4,2	2895
nichel	26,8	32100	5,0	1725
platino	32	61700	5,32	2047
tantalio	60,2	47600	4,2	3123
torio	60,2	39400	3,4	2118
tungsteno	60,2	52400	4,53	3655

ISOTOPI STABIL I

$$W^{180} = 0,12\%$$

$$W^{182} = 26,498\%$$

$$W^{183} = 14,314\% \quad 1,1 \cdot 10^{+17} \text{ (half-live)}$$

$$W^{184} = 30,642\% \quad 3 \cdot 10^{+17} \text{ (half-live)}$$

$$W^{186} = 28,42\%$$

$$R e^{185} = 37,4\%$$

$$R e^{187} = 62,6\% \quad 4,3 \cdot 10^{10} \text{ (half-live)}$$

$$O s^{184} = 0,020\% \quad 5,6 \cdot 10^{13} \text{ (half-live)}$$

$$O s^{186} = 1,58\% \quad 2 \cdot 10^{15} \text{ (half-live)}$$

$$O s^{187} = 13,3\%$$

$$O s^{189} = 16,1\%$$

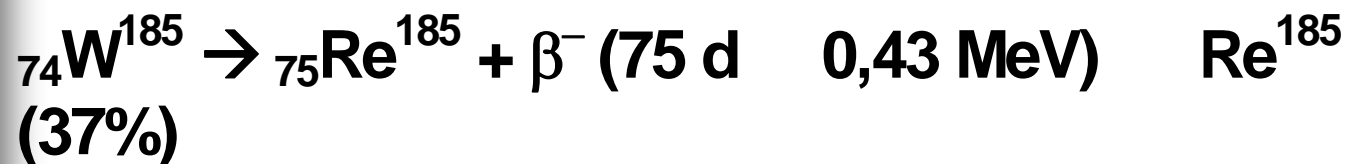
$$O s^{190} = 26,4\%$$

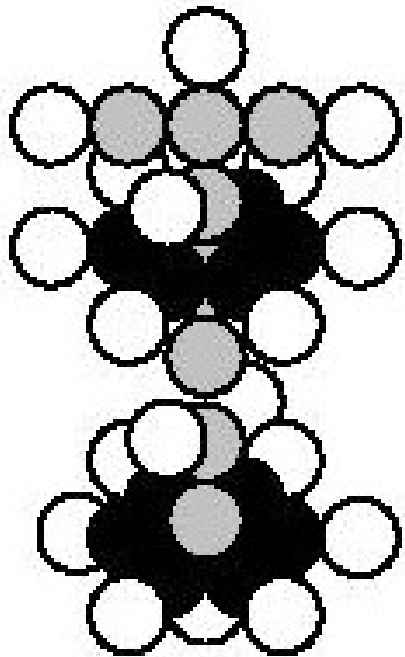
$$O s^{192} = 41,0\%$$

$$I r^{191} = 37,3\%$$

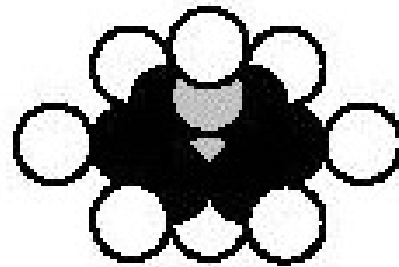
$$I r^{193} = 62,7\%$$

ALCUNE REAZIONI NUCLEARI
CONOSCIUTE DALLA FISICA

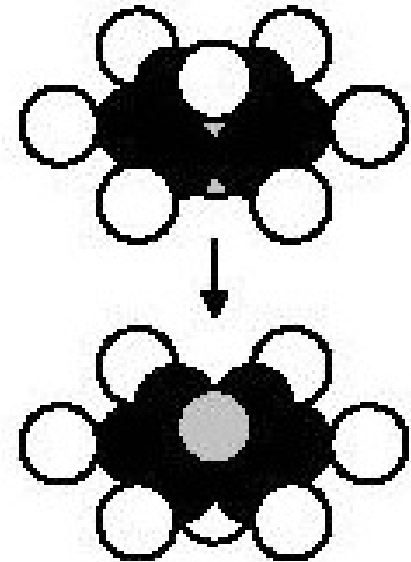




a) K (19,20)



b) O (8,8)



c) Si (14,14)

RAGGIO ATOMICO = $0.5 \cdot 10^{-10} \text{ m} - 3 \cdot 10^{-10} \text{ m}$

RAGGIO NUCLEARE MEDIO = 10^{-14} m

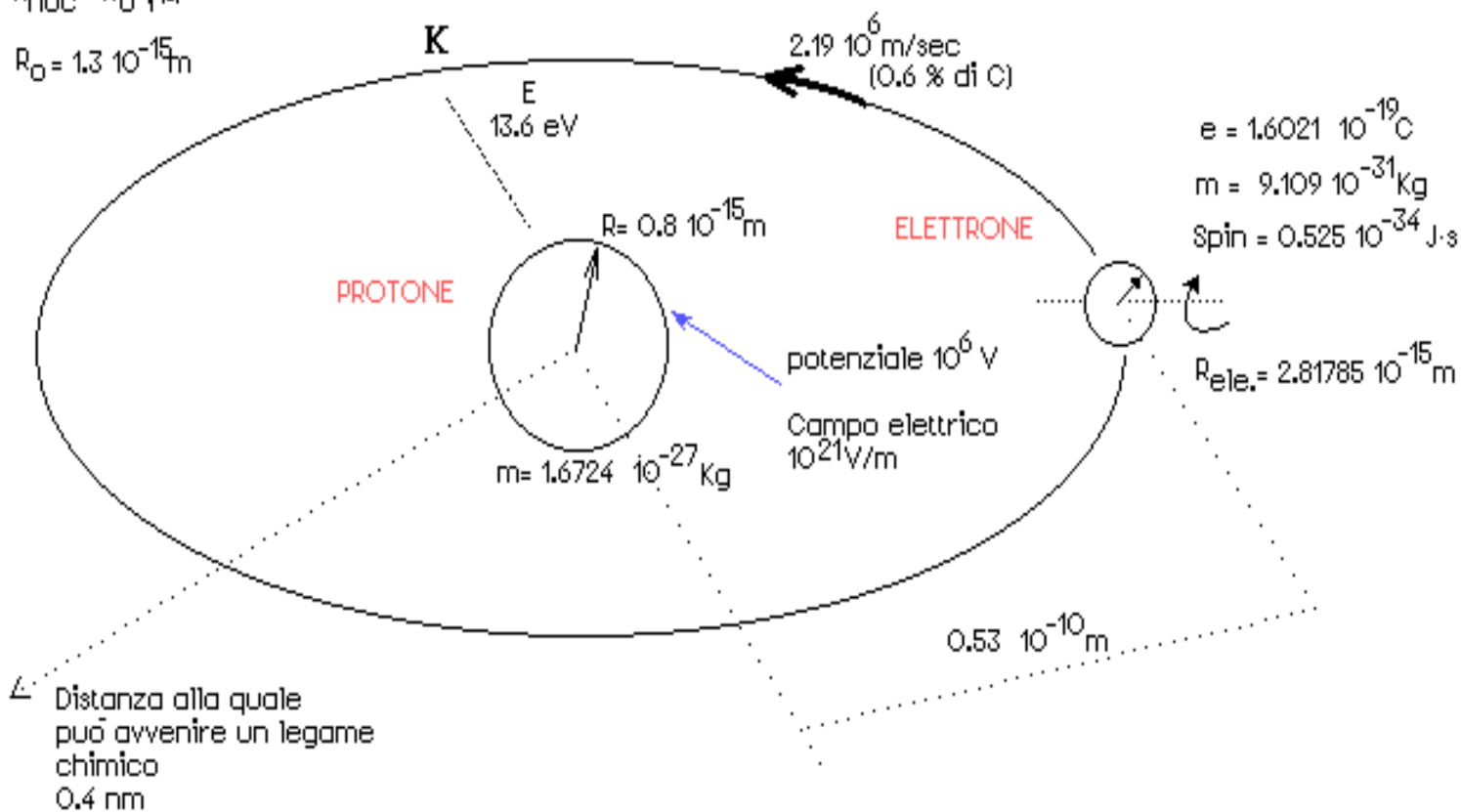
$$R_{\text{NUC}} = R_0 \sqrt[3]{A}$$

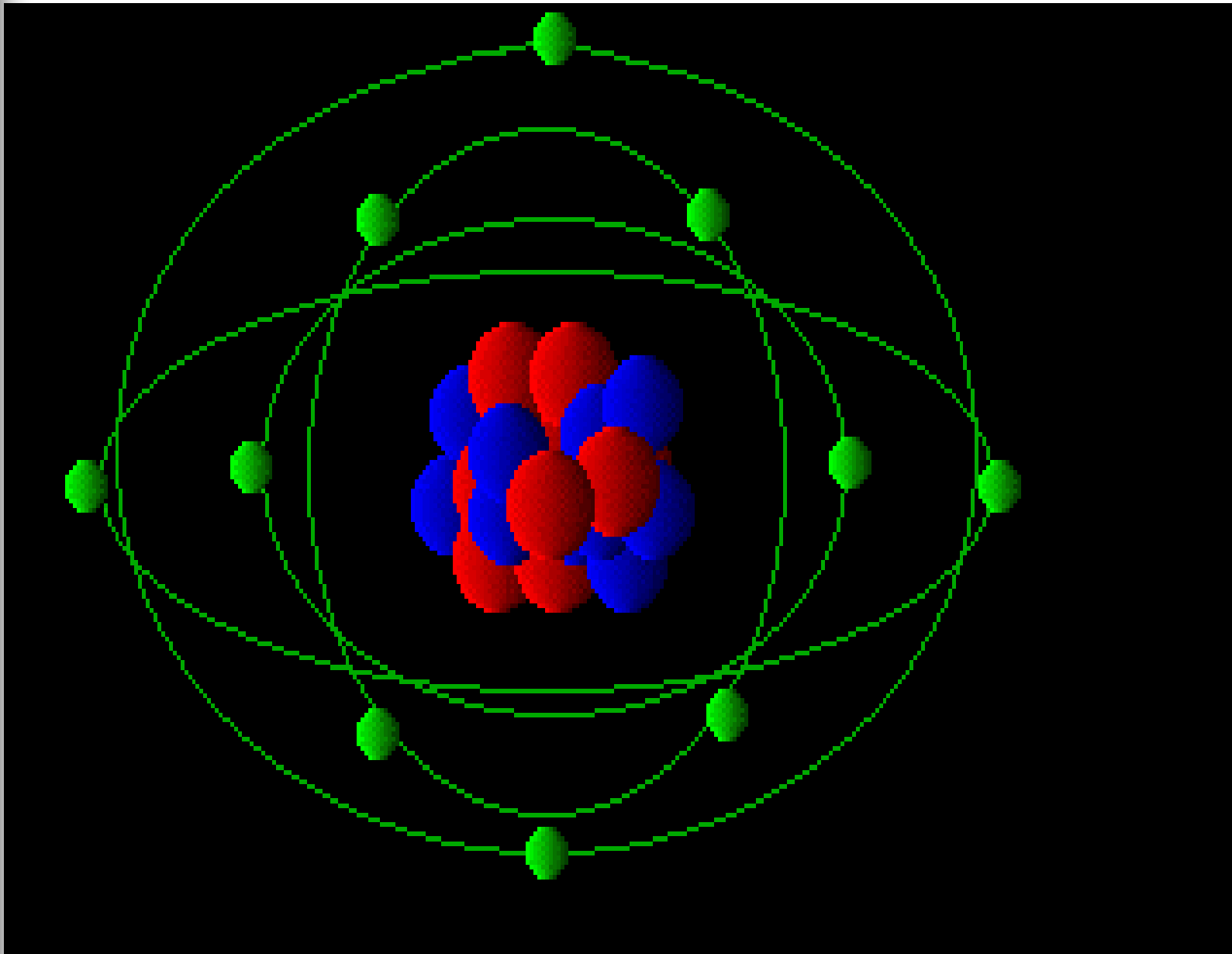
$$R_0 = 1.3 \cdot 10^{-15} \text{ m}$$

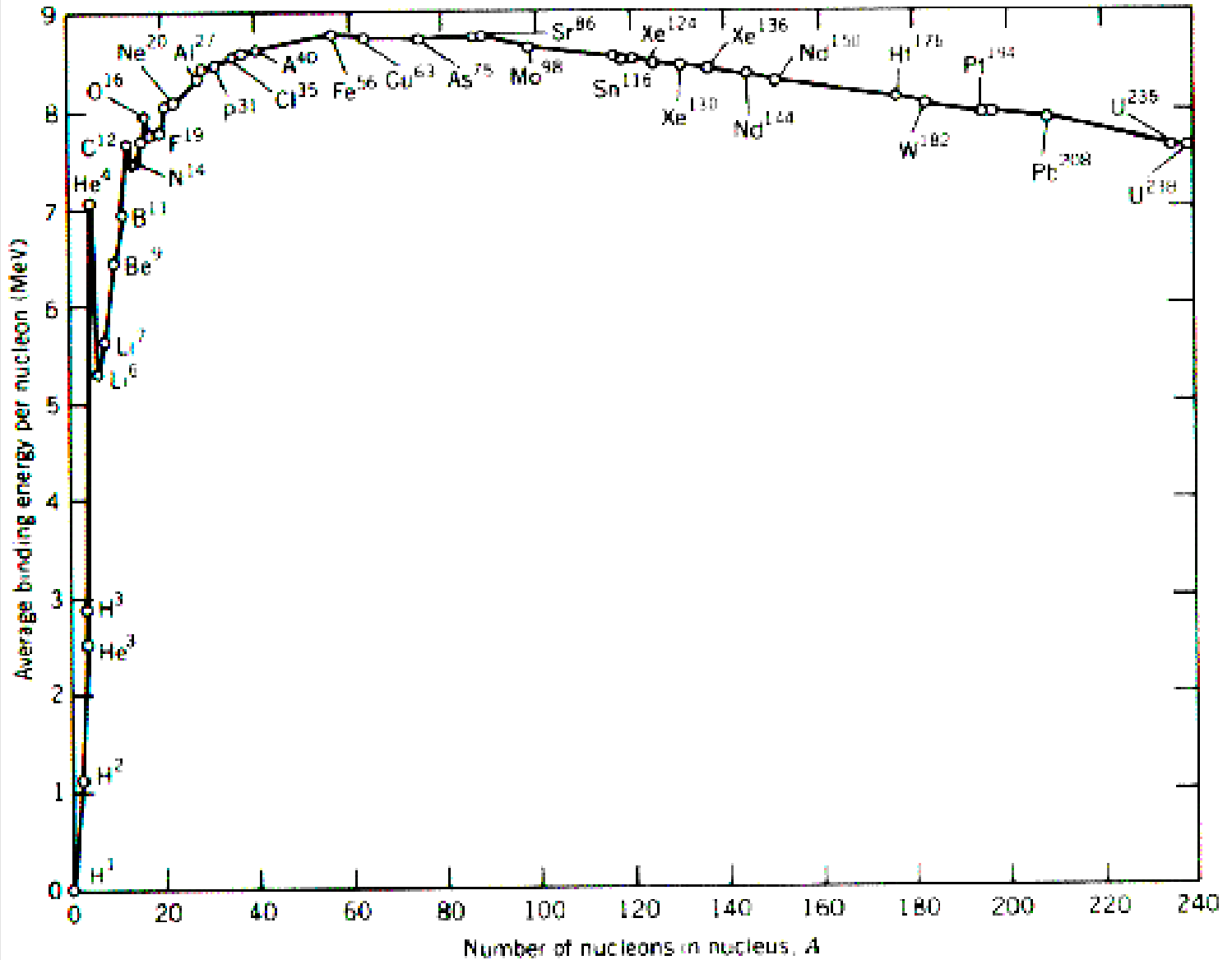
Costante di struttura fine $\alpha = 0.00729729 (137,0359)$

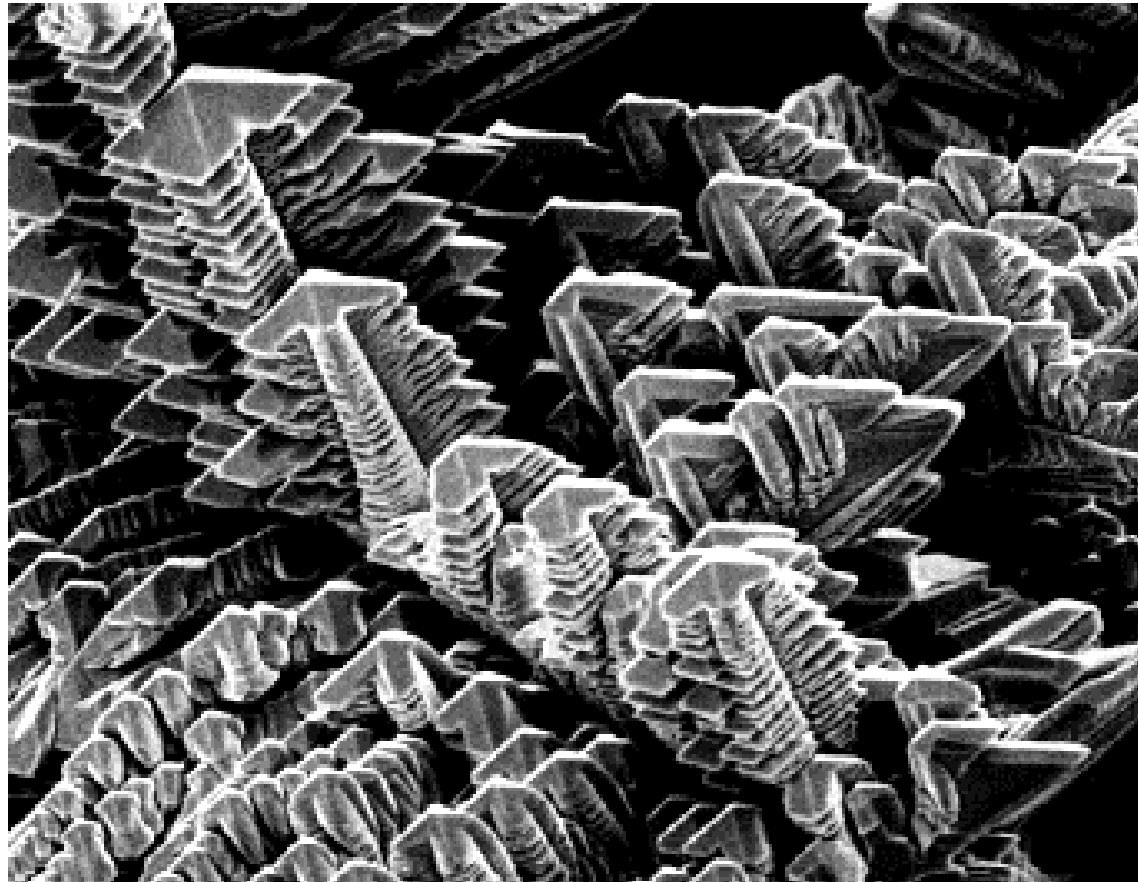
Magnetone di Bohr = $\mu_B = 0.929 \cdot 10^{-23} \text{ A m}^2$

Fattore G = 1.00115965221

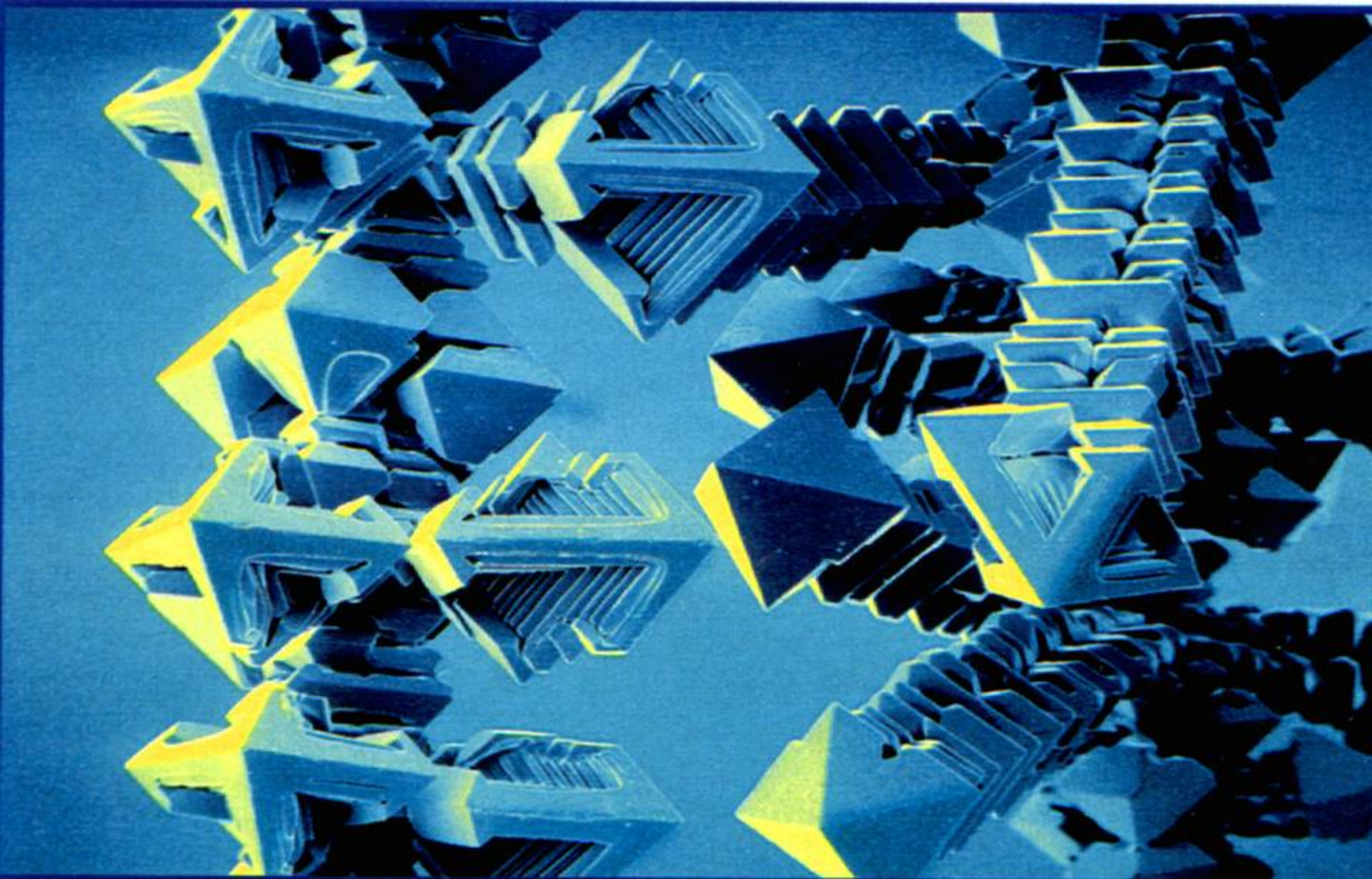








Tungsteno a 700 ingrandimenti



Superficie di Palladio al microscopio elettronico