



# Viaggio nella ...Tavola Periodica CHIMICA



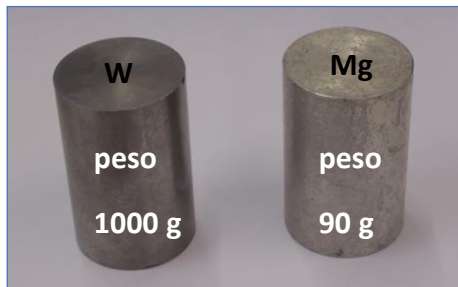
Piano Lauree Scientifiche <sup>PLS</sup>

Una passeggiata sulla tavola periodica toccando gli elementi chimici e scoprendo le proprietà periodiche ....

# Una lezione interattiva sulla tavola periodica.....



# Metalli



## La densità dei metalli



Osmio in forma cristallina  
densità = 22,6 Kg/dm<sup>2</sup>



		IIIB	IVB	VB	VIB	VII B	VIII B			IB	IIB	3p								
		3	4	5	6	7	8	9	10	11	12									
Sc	Scandio 21 44,96	Ti	Titanio 22 47,88	V	Vanadio 23 50,94	Cr	Cromo 24 52,00	Mn	Manganese 25 54,94	Fe	Ferro 26 55,84	Co	Cobalto 27 58,93	Ni	Nichel 28 58,69	Cu	Rame 29 63,55	Zn	Zinco 30 65,39	
Y	Ittrio 39 88,91	Zr	Zirconio 40 91,22	Nb	Niobio 41 92,91	Mo	Molibdeno 42 95,94	Tc	Tecnecio 43 98,91	Ru	Rutenio 44 101,07	Rh	Rodio 45 102,91	Pd	Palladio 46 106,42	Ag	Argento 47 107,87	Cd	Cadmio 48 112,41	
La - Lu	57-71	Hf	Hafnio 72 178,49	Ta	Tantalio 73 180,95	W	Tungsteno 74 183,84	Re	Reniio 75 186,21	Os	Osmio 76 190,23	Ir	Indio 77 192,22	Pt	Platino 78 195,08	Au	Oro 79 196,97	Hg	Mercurio 80 200,59	
Ac - Lr	89-103	Rf	Rutherfordio 104 261,10	Db	Dubnio 105 262,10	Sg	Seaborgio 106 263,10	Bh	Bohrio 107 264,10	Hs	Hassio 108 265,10	Mt	Mitlerio 109 266,10	Ds	Darmstadtio 110 269,10	Rg	Röntgenio 111 272,10	Cn	Copernicio 112 285,10	

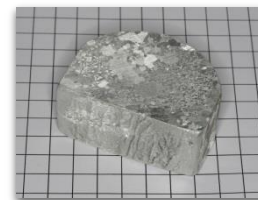
AJ	Alluminio 13 26,98
Ga	Gallio 31 69,72
In	Indio 49 114,82
Tl	Tallio 81 204,38
Pb	Piombo 82 207,26
Bi	Bismuto 83 208,98



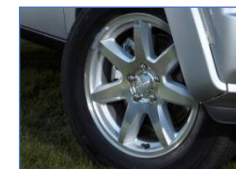
## Metalli resistenti e leggeri, loro leghe ed applicazioni



Scandio cristallino  
Densità = 2,9 Kg/dm<sup>2</sup>



Alluminio  
Densità = 2,7 Kg/dm<sup>2</sup>

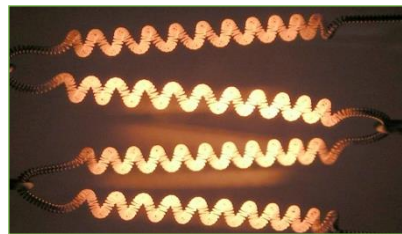


# Metalli

## I metalli e le temperature di fusione



Cucchiaino realizzato in gallio  
p.f. = 29,8 °C



Filamenti di tungsteno  
p.f. = 3410 °C



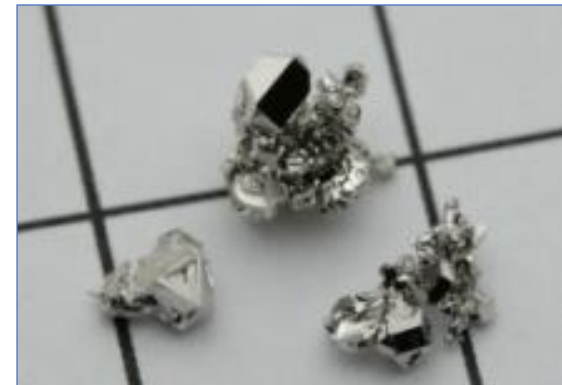
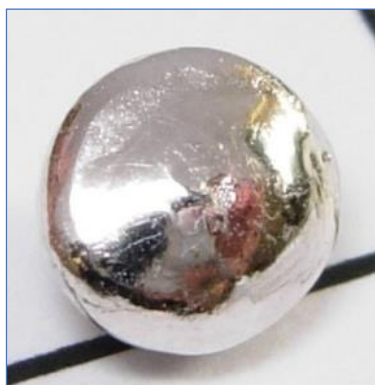
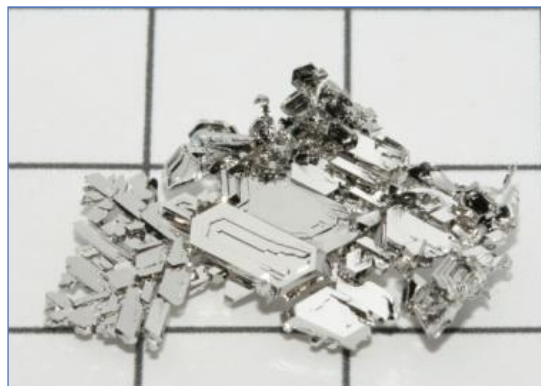
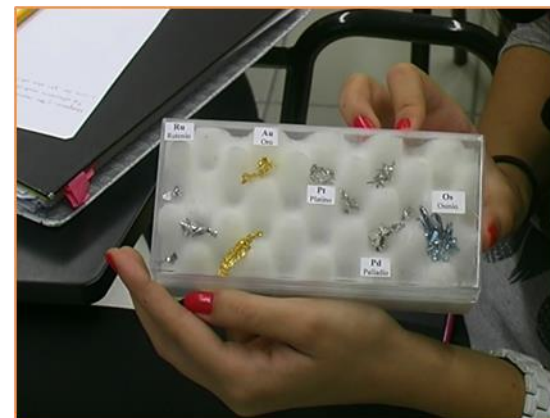
Mercurio  
p.f. = - 38 °C



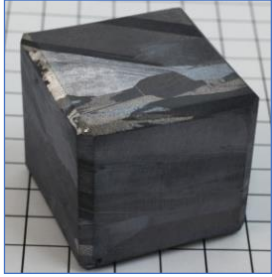
# Metalli

## Metalli preziosi

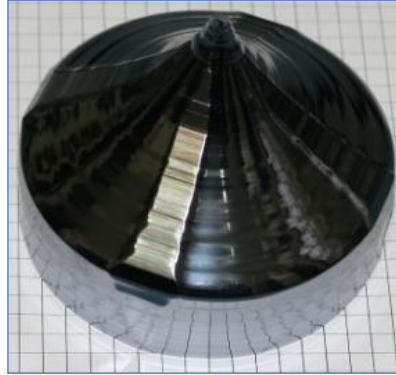
Cristalli di alcuni metalli ottenuti nei laboratori di inorganica di UNICAM con il metodo del trasporto di vapore chimico



# I semimetalli o metalloidi



Cubo di silicio policristallino



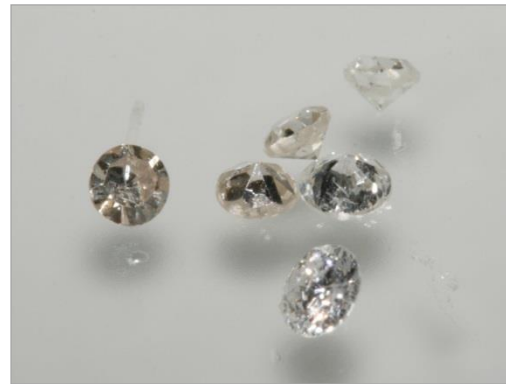
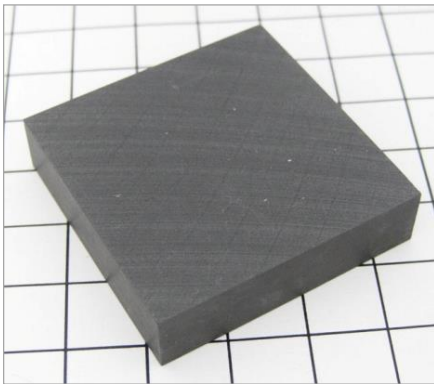
Monocristallo di silicio



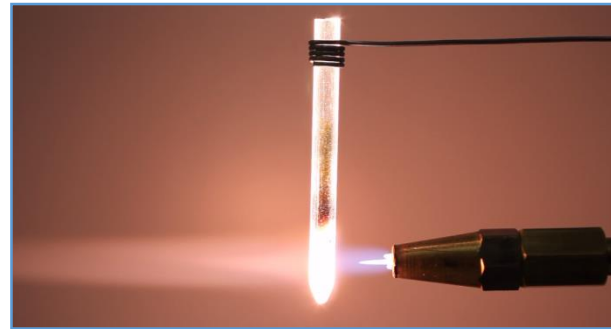
	IIIA 13	IVA 14	VA 15	VIA 16
2p	<b>B</b> Boro 5 10.81 2.46 2076			
3p		<b>Si</b> Silicio 14 28.09 2.33 1414		
4p		<b>Ge</b> Germanio 32 72.61 5.32 938	<b>As</b> Arsenico 33 74.92 5.73 614	
5p			<b>Sb</b> Antimonio 51 121.75 6.69 631	<b>Te</b> Tellurio 52 127.60 6.24 450
6p				<b>Po</b> Polonio 84 209.00 9.20 254



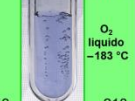


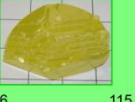
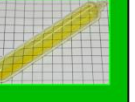



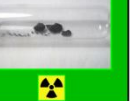
# I non metalli

## La grafite ed il diamante



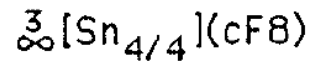
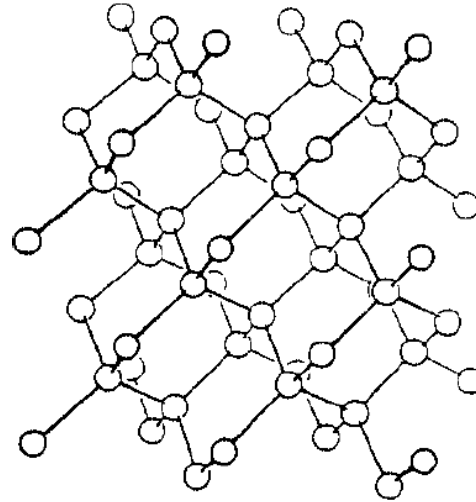
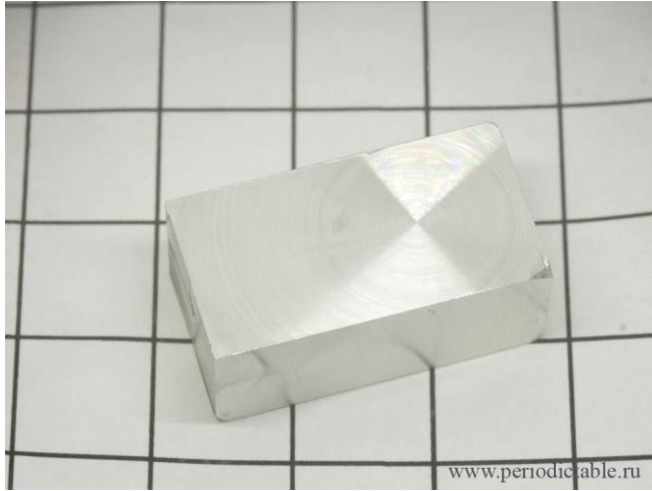
## Conversione del diamante in grafite



IVA 14	VA 15	VIA 16	VIIA 17
<b>C</b> Carbonio 6 12.01 	<b>N</b> Azoto 7 14.01 	<b>O</b> Ossigeno 8 16.00 	<b>F</b> Fluoro 9 19.00 
<b>P</b> Fosforo 15 30.97 	<b>S</b> Zolfo 16 32.07 	<b>Cl</b> Cloro 17 35.45 	
		<b>Se</b> Selenio 34 78.96 	<b>Br</b> 
			<b>I</b> Iodio 53 126.90 
			<b>At</b> Astatio 85 210.00 

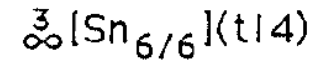
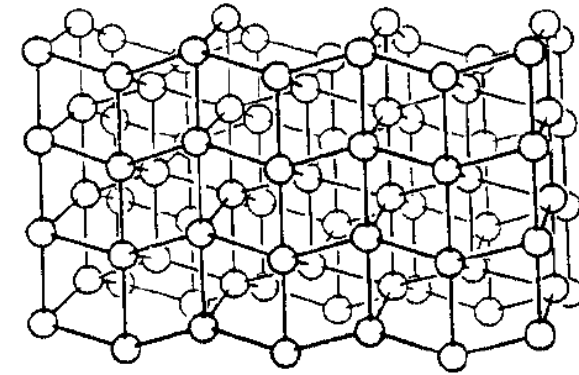
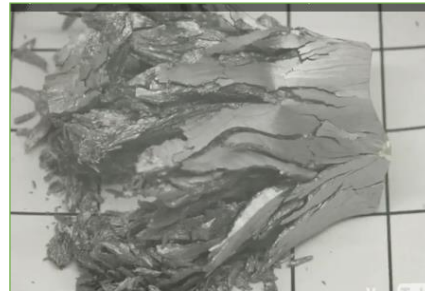
# Gli Allotropi dello Stagno

## La peste dello stagno



( $\alpha$ -tin)

**Stagno Grigio**



( $\beta$ -tin)

**Stagno Bianco**





# I non metalli

IVA  
14

VA  
15

VIA  
16

VIIA  
17

<b>C</b> Carbonio 6 12.01 	<b>N</b> Azoto 7 14.01 N <sub>2</sub> solido -212 °C 	<b>O</b> Ossigeno 8 16.00 O <sub>2</sub> liquido -183 °C 	<b>F</b> Fluoro 9 19.00 
<b>P</b> Fosforo 15 30.97 	<b>S</b> Zolfo 16 32.07 	<b>Cl</b> Cloro 17 35.45 	<b>Br</b> 
<b>Se</b> Selenio 34 78.96 	<b>I</b> Iodio 53 126.90 	<b>At</b> Astatio 85 210.00 	

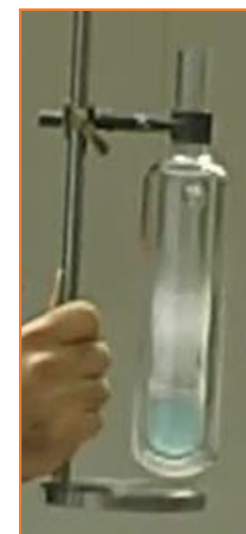
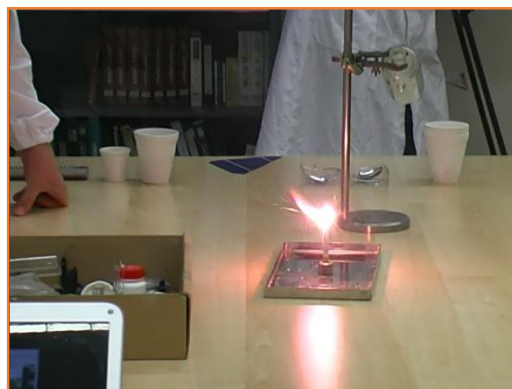
## Azoto liquido e solido



## Ossigeno liquido



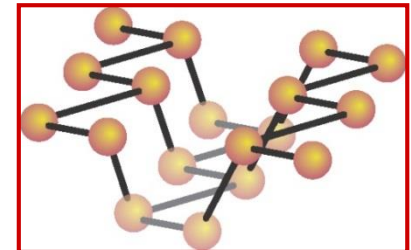
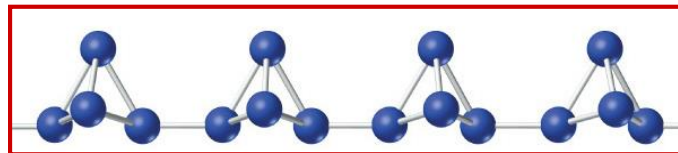
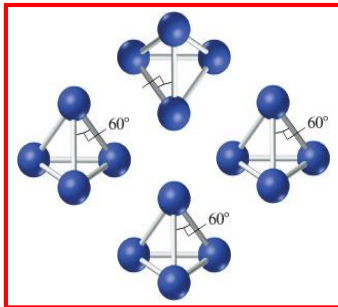
## Reattività dell'ossigeno

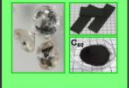


# I non metalli

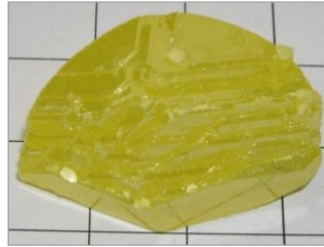


**Il fosforo**

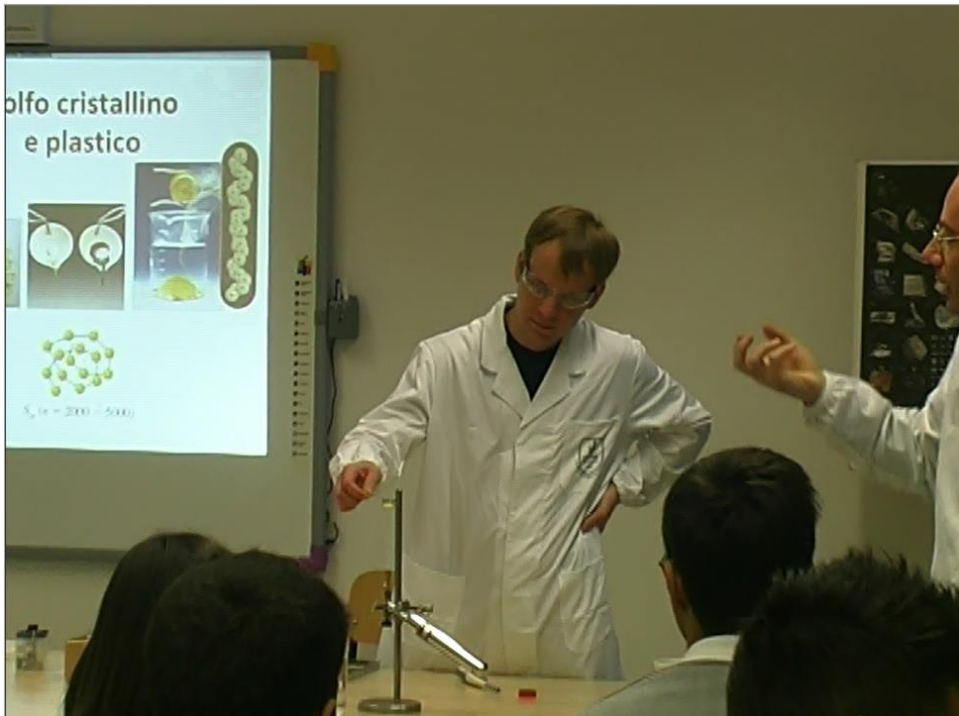


IVA 14	VA 15	VIA 16	VIIA 17
<b>C</b> Carbonio 6 12.01 	<b>N</b> Azoto 7 14.01 N <sub>2</sub> solido -212 °C 1.25 -210	<b>O</b> Ossigeno 8 16.00 O <sub>2</sub> liquido -183 °C 1.43 -218	<b>F</b> Fluoro 9 19.00 1.70 -220
	<b>P</b> Fosforo 15 30.97 1.82 44	<b>S</b> Zolfo 16 32.07 1.96 115	<b>Cl</b> Cloro 17 35.45 1.70 220
		<b>Se</b> Selenio 34 78.96 4.82 221	<b>Br</b> Bromo 35 79.90 3.00 221
			<b>I</b> Iodio 53 126.90 4.30 221
			<b>At</b> Astatio 85 210.00 6.00 221

# I non metalli



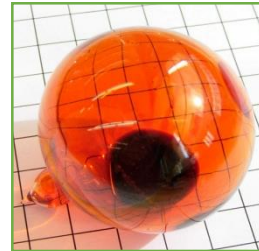
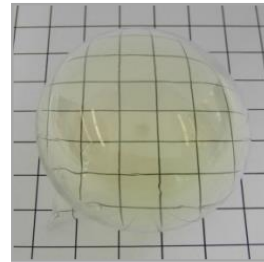
IVA 14	VA 15	VIA 16	VIIA 17
<b>C</b> Carbonio 6 12.01 	<b>N</b> Azoto 7 14.01 N <sub>2</sub> solido -212 °C 	<b>O</b> Ossigeno 8 16.00 O <sub>2</sub> liquido -183 °C 	<b>F</b> Fluoro 9 19.00 
	<b>P</b> Fosforo 15 30.97 	<b>S</b> Zolfo 16 32.07 	<b>Cl</b> Cloro 17 35.45 
		<b>Se</b> Selenio 34 78.96 	<b>Br</b> 
			<b>I</b> Iodio 53 126.90 
			<b>At</b> Astatio 85 210.00 



Conversione in zolfo plastico



# I non metalli: Gli Alogeni



IVA 14	VA 15	VIA 16	VIIA 17
<b>C</b> Carbonio 6 12.01 	<b>N</b> Azoto 7 14.01 N <sub>2</sub> solido -212 °C 	<b>O</b> Ossigeno 8 16.00 O <sub>2</sub> liquido -183 °C 	<b>F</b> Fluoro 9 19.00 
	<b>P</b> Fosforo 15 30.97 	<b>S</b> Zolfo 16 32.07 	<b>Cl</b> Cloro 17 35.45 
		<b>Se</b> Selenio 34 78.96 	<b>Br</b> 
			<b>I</b> Iodio 53 126.90 
			<b>At</b> Astatio 85 210.00 

Passaggi di stato del cloro

Gas

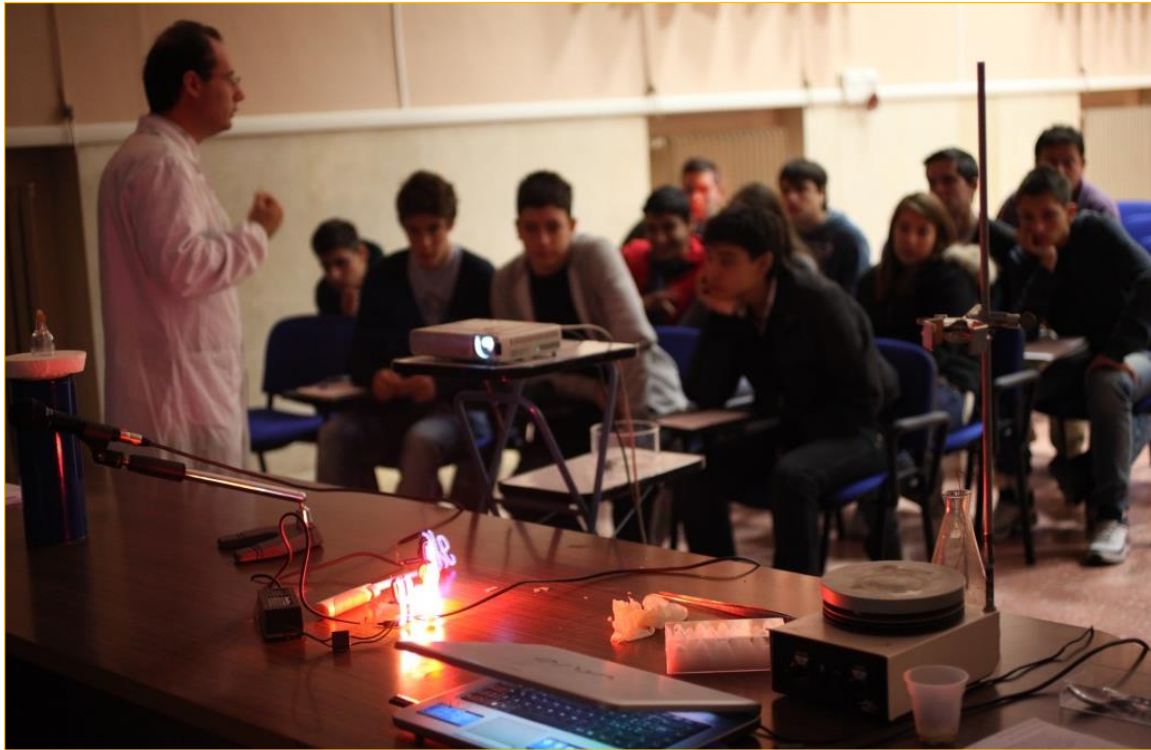


Liquido



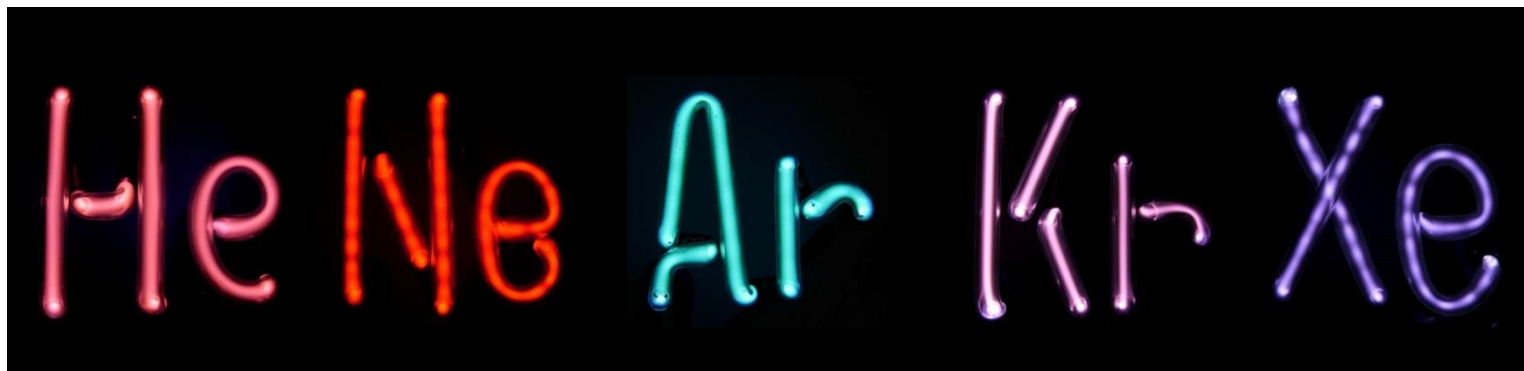
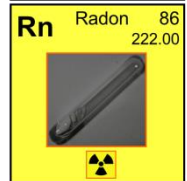
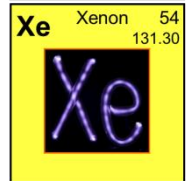
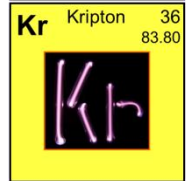
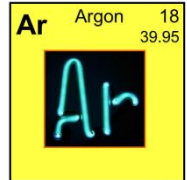
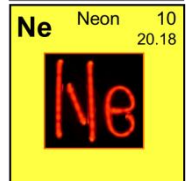
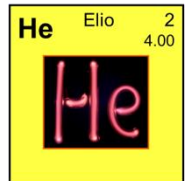
solido

# I non metalli: I gas nobili

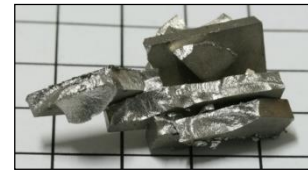
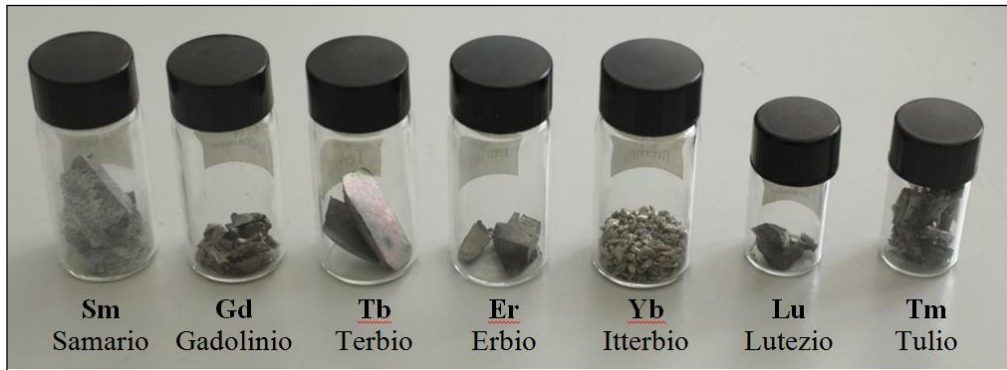


VIIIA

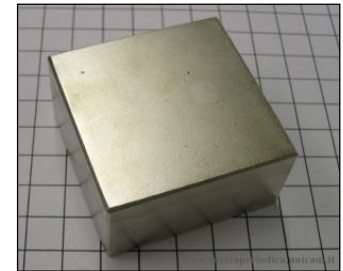
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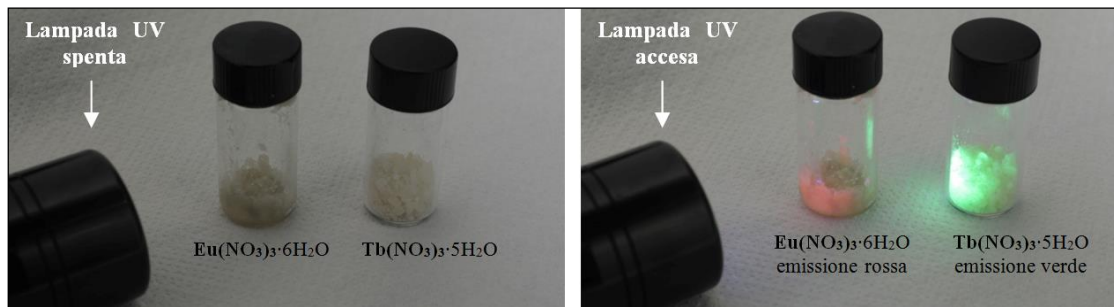
# Terre rare: I Lantanidi



Magneti di samario-cobalto  $\text{SmCo}_5$ .



Magnete al neodimio



4f

5f

La Lantano 57 138.90	Ce Cerio 58 140.12	Pr Praseodimio 59 140.91	Nd Neodimio 60 144.24	Pm Promezio 61 (145)	Sm Samario 62 150.36	Eu Europio 63 151.97	Gd Gadolinio 64 157.25	Tb Terbio 65 158.92	Dy Disproio 66 162.50	Ho Olmio 67 164.93	Er Erbio 68 167.26	Tm Tulio 69 168.93	Yb Itterbio 70 173.04	Lu Lutezio 71 174.97
6.14 921	6.77 799	6.48 931	7.01 1021	7.22 1168	7.52 1077	5.24 822	7.90 1313	8.23 1356	8.55 1412	8.79 1474	9.07 1528	9.32 1545	6.96 824	9.84 1663
Ac Attinio 89 227.03	Th Torio 90 232.04	Pa Protoattinio 91 231.03	U Uranio 92 238.03	Np Nettunio 93 237.05	Pu Plutonio 94 244.10	Am Americio 95 243.10	Cm Curio 96 247.10	Bk Berchelio 97 247.09	Cf Californio 98 251.10	Es Einsteinio 99 252.10	Fm Fermio 100 257.10	Md Mendelevio 101 258.10	No Nobelio 102 259.10	Lr Laurenzio 103 260.00
10.07 1047	11.72 1750	15.37 1840	18.97 1132	20.48 640	19.74 641	13.67 994	13.30 1337	14.78 1050	15.10 900	8.84 860	---	---	---	---