

2019
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International Year of the Periodic Table of Chemical Elements

MENDELEEV

Father of the periodic table

Dmitry Ivanovich Mendeleev

Born: February 8, 1834 (Tobolsk, Siberia)

Died (February 2, 1907) St. Petersburg, Russia



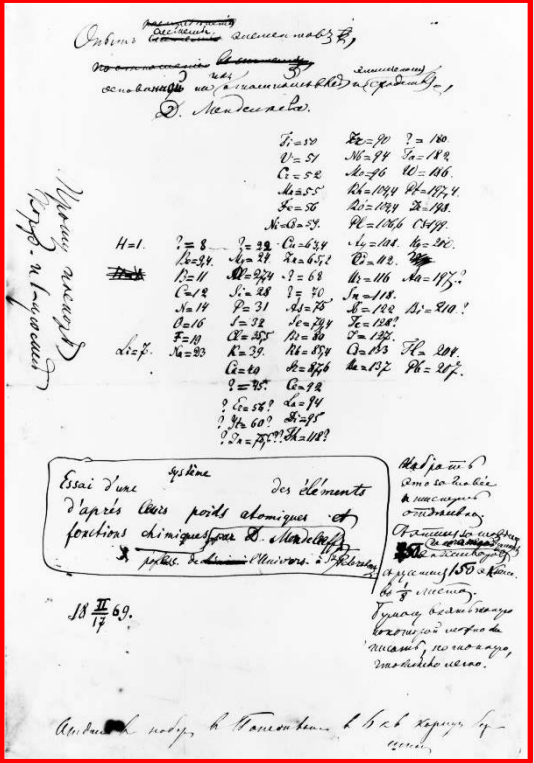
Monument to the periodic table

In front of the Faculty of Chemical and Food Technology of the Slovak University of Technology in Bratislava, Slovakia to honor Mendeleev

Reihen	Gruppe I. — R ⁰	Gruppe II. — R ⁰	Gruppe III. — R ⁰ ³	Gruppe IV. RH ⁴ RO ²	Gruppe V. RH ⁵ R ⁰ O ⁵	Gruppe VI. RH ⁶ RO ³	Gruppe VII. RH R ⁰ O ⁷	Gruppe VIII. — RO ⁴
1	H=1							
2	Li=7	Be=9.4	B=11	C=12	N=14	O=16	F=19	
3	Na=23	Mg=24	Al=27.3	Si=28	P=31	S=32	Cl=35.5	
4	K=39	Ca=40	—=44	Ti=48	V=51	Cr=52	Mn=55	Fe=56, Co=59, Ni=59, Cu=63.
5	(Cu=63)	Zn=65	—=68	—=72	As=75	Se=78	Br=80	
6	Rb=85	Sr=87	?Yt=88	Zr=90	Nb=94	Mo=96	—=100	Ru=104, Rh=104, Pd=106, Ag=108.
7	(Ag=108)	Cd=112	In=113	Sn=118	Sb=122	Te=125	J=127	
8	Cs=133	Ba=137	?Di=138	?Ce=140	—	—	—	—
9	(—)	—	—	—	—	—	—	—
10	—	—	?Er=178	?La=180	Ta=182	W=184	—	Os=195, Ir=197, Pt=198, Au=199.
11	(Au=199)	Hg=200	Tl=204	Pb=207	Bi=208	—	—	—
12	—	—	—	Th=231	—	U=240	—	—

Periodische Gesetzmässigkeit der Elemente nach Mendeleeff

Reihen	Gruppe I R ² D	Gruppe II RO	Gruppe III R ² O ³	Gruppe IV RH ⁴ RO ²	Gruppe V RH ³ R ² O ⁵	Gruppe VI RH ² RO ³	Gruppe VII RH R ² O ⁷	Gruppe VIII RO ⁴
1	H=1							
2	Li=7	Be=9.4	B=11	C=12	N=14	O=16	F=19	
3	Na=23	Mg=24	Al=27.3	Si=28	P=31	S=32	Cl=35.5	
4	K=39	Ca=40	Sc=44	Ti=48	V=51	Cr=52	Mn=55	Fe=56, Co=59, Ni=59, Cu=63
5	(Cu=63)	Zn=65	Ga=68	—=72	As=75	Se=79	Br=80	
6	Rb=85	Sr=87	Yt=88	Zr=90	Nb=94	Mo=96	—=100	Ru=104, Rh=104, Pd=106, Ag=108
7	(Ag=108)	Cd=112	In=113	Sn=118	Sb=122	Te=125	J=127	
8	Cs=133	Ba=137	Ce=137	La=139	—	Di=145?	—	—
9	(—)	—	—	—	—	—	—	—
10	—	—	—	—	—	—	—	—
11	(Au=199)	Hg=200	Tl=204	Pb=208	Bi=210	—	—	—
12	—	—	—	Th=231	—	—	—	—



On 6th March 1869, Dmitri Mendeleev presented the **first periodic table** to the Russian Chemical Society. In his presentation, “**The Dependence between the Properties of the Atomic Weights of the Elements**”, he categorized chemical elements according to atomic weight and valency. He stated the Periodic law, as “**when elements are ordered according to their atomic weights, certain properties of elements repeat periodically**”.

Mendeleev's manuscript of the periodic table, 1869, Science Museum Group Collection

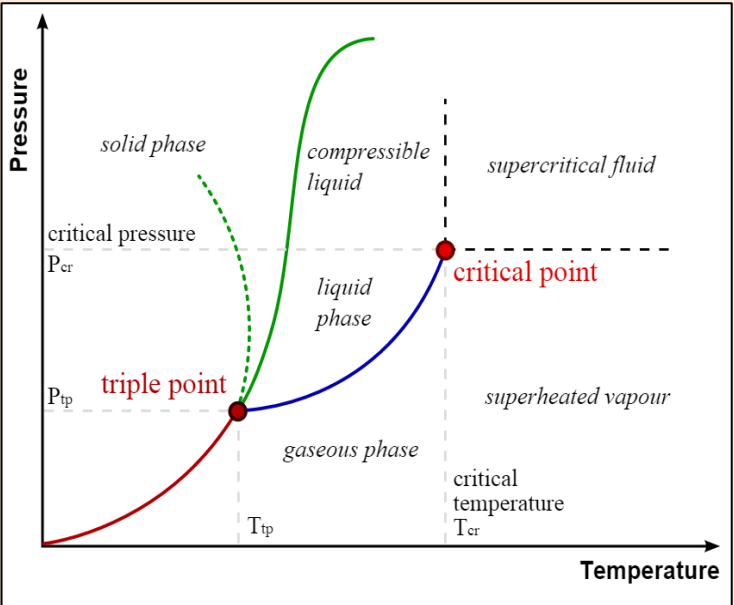
A Mendeleev Prediction (1871)		
	PREDICTED PROPERTIES Eksasilicon (Es)	ACTUAL PROPERTIES Germanium (Ge)
ATOMIC WEIGHT	72	72.59
DENSITY	5.6 g/cm ³	5.35 g/cm ³
VALENCE	4	4
MELTING POINT	high	937.4°C
COLOR OF METAL	dark gray	gray-white
FORM OF OXIDE	EsO ₂	GeO ₂
DENSITY OF OXIDE	4.7 g/cm ³	4.23 g/cm ³
FORM OF CHLORIDE	EsCl ₄	GeCl ₄
DENSITY OF CHLORIDE	1.9 g/cm ³	1.84 g/cm ³
B.P. OF CHLORIDE	<100°C	84°C

Mendeleev correctly predicted the existence, and properties, of yet undiscovered elements

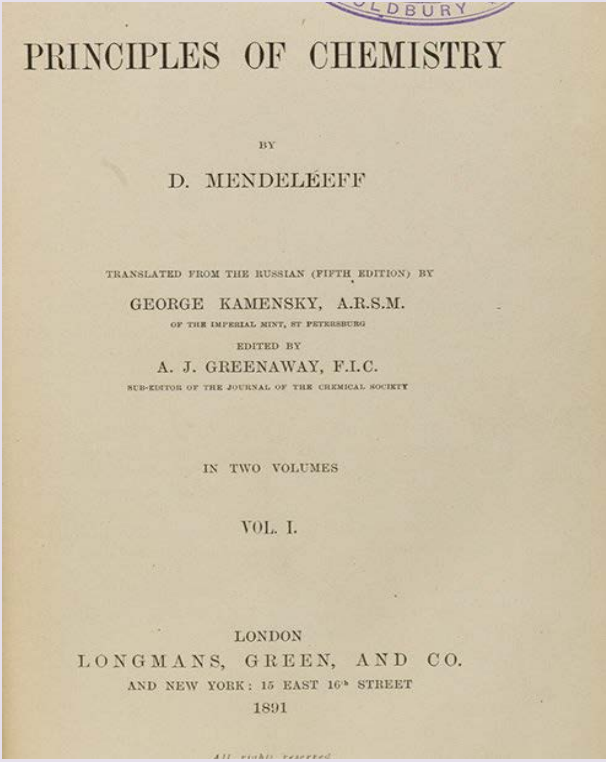
Mendeleev's Periodic Table (1869)

I	II	III	IV	V	VI	VII	VIII
H 1.01	Li 6.94	Be 9.01	B 10.8	C 12.0	N 14.0	O 16.0	F 19.0
Na 23.0	Mg 24.3	Al 27.0	Si 28.1	P 31.0	S 32.1	Cl 35.5	
K 39.1	Ca 40.1		Ti 47.9	V 50.9	Cr 52.0	Mn 54.9	
Cu 63.5	Zn 65.4		As 74.9	Se 79.0	Br 79.9		
Rb 85.5	Sr 87.6	Y 88.9	Zr 91.2	Nb 92.9	Mo 95.9		
Ag 108	Cd 112	In 115	Sn 119	Sb 122	Te 128	I 127	
Ce 133	Ba 137	La 139	Pb 207	Ta 181	W 184		
Au 197	Hg 201	Tl 204	Th 232	Bi 209	U 238		

Over a single weekend in 1869, Dmitri Mendeleev invents the Periodic Table



He investigated the expansion of liquids and defined critical temperature of gases



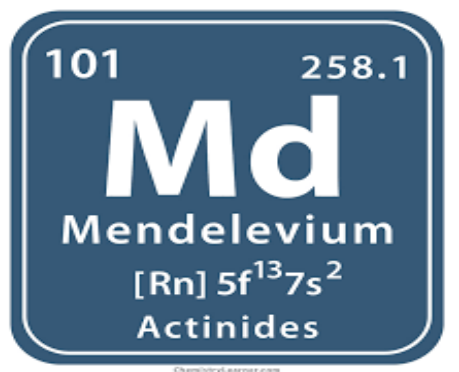
His renowned work *Osnovy khimii* (*The Principles of Chemistry*, 1868–71) was published in two volumes



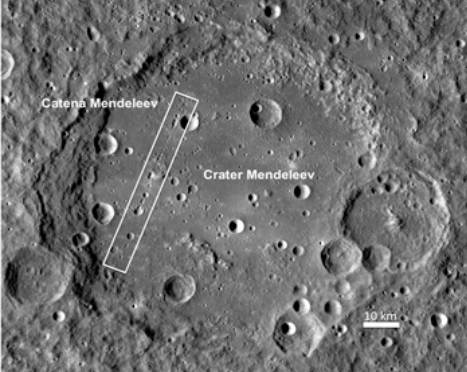
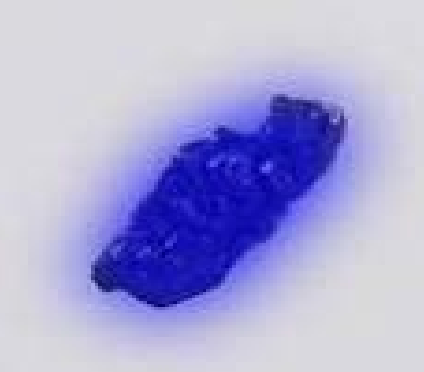
Mendeleev discovered **Pyrocollodion**, a smokeless powder in 1892 as a replacement for gunpowder for use in the Russian Navy



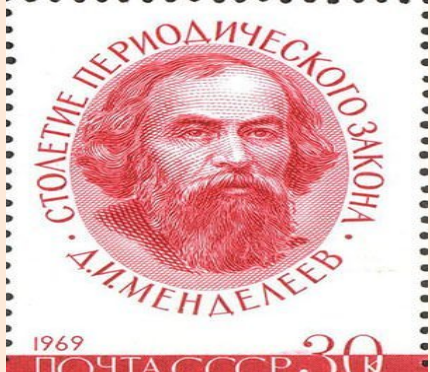
Mendeleev helped in the formation of the first oil refinery in Russia and was also the first to suggest the idea of using **pipelines for transportation** of fuel in 1863



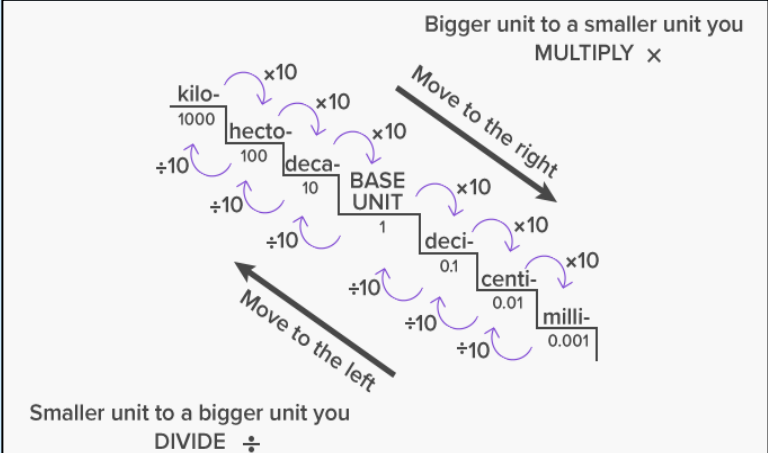
Mendelevium, a synthetic element with the symbol **Md** (formerly **Mv**) and **atomic number 101**, is a metallic radioactive transuranic element in the actinide series. It is the first element that currently cannot be produced in macroscopic quantities through neutron bombardment of lighter elements



A large **lunar impact crater Mendeleev**, that is located on the far side of the Moon, bears the name of the scientist.



Soviet Union 1969 stamp honoring Dmitri Mendeleev



Mendeleev studied metrology, the scientific study of measurements. He developed a precise theory of weights; designed an excellent balance arm and arresting device; and proposed exact methods of weighing. Mendeleev is given credit for the introduction of the metric system in Russia. The **D.I. Mendeleev All-Russian Institute for Metrology (VNIIM)**, one of the largest world centers of scientific and practical metrology, is named to honor him.

