Geology in Your Kitchen

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Princeton University Library, Lewis Science Library

Zenodo link

Library Research Guide

Abstract

This poster presentation provides an overview of print and digital resources available for Earth's mineral resources used to create items in your kitchen. Attendees will learn the differences (and similarities) of critical minerals, conflict minerals, rare earths, and other mineral terminologies used around the world in the contexts of sustainability and economic growth, as well as environmental considerations of mineral extractions, uses, and wastes in everyday life.

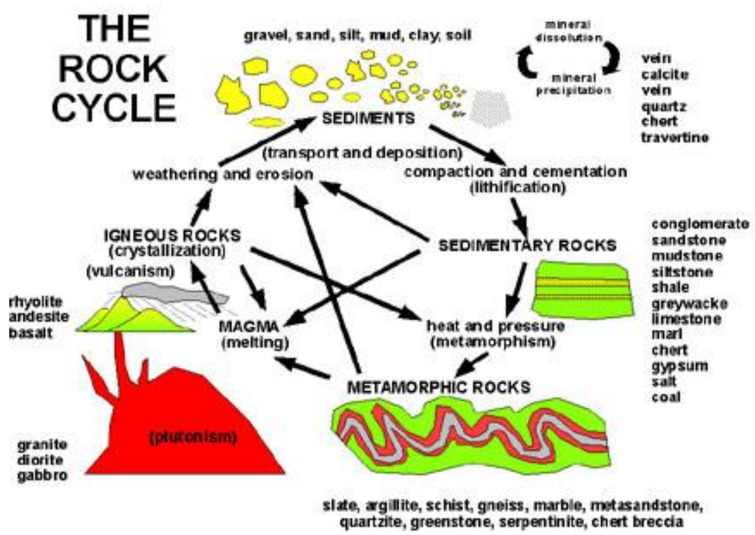
IUPAC Periodic Table of the Elements

1												13	14	15	16	17	18
1 H hydrogen 1.0080 ±0.0002	2		Key: atomic number Symbol name abridged standard atomic weight									5 B boron 10.81 ±0.02	6 C carbon 12.011 ±0.002	7 N nitrogen 14.007 ±0.001	8 O oxygen 15.999 ±0.001	9 F fluorine 18.998 ±0.001	2 He helium 4.0026 ±0.0001
3 Li lithium 6.94 ±0.06	4 Be beryllium 9.0122 ±0.0001											13 Al aluminium 26.982 ±0.001	14 Si silicon 28.085 ±0.001	15 P phosphorus 30.974 ±0.001	16 S sulfur 32.06 ±0.02	17 Cl chlorine 35.45 ±0.01	10 Ne neon 20.180 ±0.001
11 Na sodium 22.990 ±0.001	12 Mg magnesium 24.305 ±0.002	3	4	5	6	7	8	9	10	11	12						18 Ar argon 39.95 ±0.16
19 K potassium 39.098 ±0.001	20 Ca calcium 40.078 ±0.004	21 Sc scandium 44.956 ±0.001	22 Ti titanium 47.867 ±0.001	23 V vanadium 50.942 ±0.001	24 Cr chromium 51.996 ±0.001	25 Mn manganese 54.938 ±0.001	26 Fe iron 55.845 ±0.002	27 Co cobalt 58.933 ±0.001	28 Ni nickel 58.693 ±0.001	29 Cu copper 63.546 ±0.003	30 Zn zinc 65.38 ±0.02	31 Ga gallium 69.723 ±0.001	32 Ge germanium 72.630 ±0.008	33 As arsenic 74.922 ±0.001	34 Se selenium 78.971 ±0.008	35 Br bromine 79.904 ±0.003	36 Kr krypton 83.798 ±0.002
37 Rb rubidium 85.468 ±0.001	38 Sr strontium 87.62 ±0.01	39 Y yttrium 88.906 ±0.001	40 Zr zirconium 91.224 ±0.002	41 Nb niobium 92.906 ±0.001	42 Mo molybdenum 95.95 ±0.01	43 Tc technetium [97]	44 Ru ruthenium 101.07 ±0.02	45 Rh rhodium 102.91 ±0.01	46 Pd palladium 106.42 ±0.01	47 Ag silver 107.87 ±0.01	48 Cd cadmium 112.41 ±0.01	49 In indium 114.82 ±0.01	50 Sn tin 118.71 ±0.01	51 Sb antimony 121.76 ±0.01	52 Te tellurium 127.60 ±0.03	53 I iodine 126.90 ±0.01	54 Xe xenon 131.29 ±0.01
55 Cs caesium 132.91 ±0.01	56 Ba barium 137.33 ±0.01	57-71 lanthanoids	72 Hf hafnium 178.49 ±0.01	73 Ta tantalum 180.95 ±0.01	74 W tungsten 183.84 ±0.01	75 Re rhenium 186.21 ±0.01	76 Os osmium 190.23 ±0.03	77 Ir iridium 192.22 ±0.01	78 Pt platinum 195.08 ±0.02	79 Au gold 196.97 ±0.01	80 Hg mercury 200.59 ±0.01	81 Tl thallium 204.38 ±0.01	82 Pb lead 207.2 ±1.1	83 Bi bismuth 208.98 ±0.01	84 Po polonium [209]	85 At astatine [210]	86 Rn radon [222]
87 Fr francium [223]	88 Ra radium [226]	89-103 actinoids	104 Rf rutherfordium [267]	105 Db dubnium [268]	106 Sg seaborgium [269]	107 Bh bohrium [270]	108 Hs hassium [269]	109 Mt meitnerium [277]	110 Ds darmstadtium [281]	111 Rg roentgenium [282]	112 Cn copernicium [285]	113 Nh nihonium [286]	114 Fl flerovium [290]	115 Mc moscovium [290]	116 Lv livermorium [293]	117 Ts tennessine [294]	118 Og oganesson [294]

57 La lanthanum 138.91 ±0.01	58 Ce cerium 140.12 ±0.01	59 Pr praseodymium 140.91 ±0.01	60 Nd neodymium 144.24 ±0.01	61 Pm promethium [145]	62 Sm samarium 150.36 ±0.02	63 Eu europium 151.96 ±0.01	64 Gd gadolinium 157.25 ±0.03	65 Tb terbium 158.93 ±0.01	66 Dy dysprosium 162.50 ±0.01	67 Ho holmium 164.93 ±0.01	68 Er erbium 167.26 ±0.01	69 Tm thulium 168.93 ±0.01	70 Yb ytterbium 173.05 ±0.02	71 Lu lutetium 174.97 ±0.01
89 Ac actinium [227]	90 Th thorium 232.04 ±0.01	91 Pa protactinium 231.04 ±0.01	92 U uranium 238.03 ±0.01	93 Np neptunium [237]	94 Pu plutonium [244]	95 Am americium [243]	96 Cm curium [247]	97 Bk berkelium [247]	98 Cf californium [251]	99 Es einsteinium [252]	100 Fm fermium [257]	101 Md mendelevium [258]	102 No nobelium [259]	103 Lr lawrencium [262]

INTERNATIONAL UNION OF PURE AND APPLIED CHEMISTRY

For notes and updates to this table, see www.iupac.org. This version is dated 4 May 2022.



Library Research Sources for Education and Outreach

Mineral Resources

Figure 1 – Periodic Table of Elements

Figure 2 – The Rock Cycle

Figure 3 – Overview of Rocks in a Kitchen

- **Counter – Natural Granite (or Engineered Stone)**
- **Refrigerator – Stainless Steel, Aluminum, Copper, Iron, Nickel, Petroleum Products, Zinc**
- **Stove – Burners, Natural Gas ;**
- **Microwave – Copper, Gold, Iron, Nickel, Silica**
- **Toaster – Copper, Iron, Nickel, Mica, Chromium, Petroleum Products**
- **Lights and Appliances – Electricity, Nuclear**
- **Stainless Steel Sink – Iron and Nickel**
- **Apples (and Rice) – Arsenic**
- **Table Salt – Halite**
- **Plates – Clays, Silica, Feldspar**
- **Cutlery – Iron, Nickel, Silver, Chromium**
- **Medicines :**
  - **Cold/Flu/Pain – Critical Minerals (Catalysis)**
  - **Upset Stomach – Bismuth**
- **Vitamins, Supplements – Calcium, Magnesium**
- **Pencil for Grocery List – Graphite**
- **Batteries for Technology – Cobalt, Lithium, Graphite**

Geology Terminologies

Critical Minerals – a non-fuel mineral or mineral material essential to the economic or national security of the U.S. and which has a supply chain vulnerable to disruption, Figure 4

Examples: Aluminum, Arsenic, Bismuth, Chromium, Cobalt, Graphite, Magnesium, Nickel, Tin, Titanium, Tungsten, Zinc. Zirconium

Conflict Minerals – minerals used to fund terrorists and other armed groups who seek to commit crimes and overthrow legitimate governments

Examples: Diamonds, Gold, Tin, Titanium

Rare Earth Minerals - bastnasite, monazite, and loparite and the lateritic ion-adsorption clays ; a relatively abundant group of 17 elements composed of scandium, yttrium, and the lanthanides