

D-Series Set 1

First Edition



What is the D-Series?

- The D-series is a collection of datasheets across the disciplines of science.
- They aim to provide accurate and detailed information for everyone to access.
- All datasheets are produced in one of two possible set designs:
 - Diagrammatic – Focusing on a Diagram
 - Analytic – Focusing on Data.
- Each datasheet is provided alongside a detailed source document.
 - This document provides citations in Harvard format.



What is Set 1?

Set 1 is the first eight datasheets released to the D-series, they focus on the physical sciences – chemistry and physics.

D1

Periodic Table
of Elements

D2

Properties of
Elements

D3

Properties of
Nuclides*

D4

Standard Model of
Elementary Particles

D5

Properties of
Elementary Particles

D6

SI Unit
Definitions

D7

SI Defining
Physical Constants

D8

Radioactive
Decay Modes

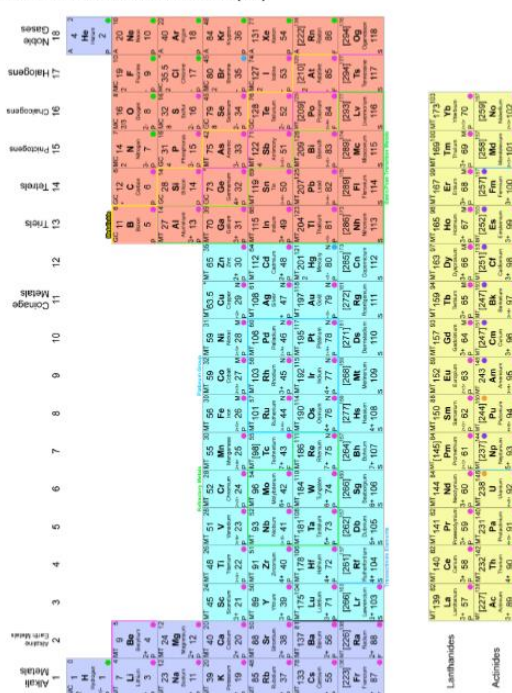


* Not included in the first edition

Diagrammatic Datasheets

D1 and D4 are diagrammatic datasheets.

PERIODIC TABLE OF ELEMENTS (D1)



Key:

Element Representation:

1	A	N
2		3
Chemical Symbol		
Element Name		
Z		6
4		7

- Simple Substance Bonding (Symbols are: MT, Metallic; GC, Giant Covalent; MC, Molecular Covalent; A, Single Atom)
- Atomicity (if no number, only 1 atom is present)
- Neutron Number
- Actinide Type (Symbols are: Major, Minor)
- Mass Number (If bracketed, element is radioactive)
- Atomic/Proton Number
- Ionic Charge
- Natural Occurrence (Symbols are: P, Primordial; F, From Decay; S, Synthetic)
- Additional Properties (Symbols are: M, Ferromagnetic; N, Noble Metal)
- State of Matter/Phase at Standard Temperature and Pressure (Symbols are: Solid, Liquid, Gas)

Block Representation:

s p d f

Electron Shell Filling Order:

1s
2s 2p
3s 3p 3d
4s 4p 4d 4f
5s 5p 5d 5f ...
6s 6p 6d ...

Source: User:Atchemy [wikimedia.org] - CC-BY-SA-4.0

Sources:

- Simple Substance Bonding, 1 [8] [9] [10] [11] [12] [13] [14]
- Atomicity, 2[28]
- Neutron Number, N [15] [16] [17] [18] [19]
- Actinide Type, 3[28]
- Mass Number, A [15] [16] [17] [18] [19]
- Chemical Symbol [15] [16] [17] [18] [19]
- Element Name [15] [16] [17] [18] [19]
- Atomic/Proton Number, Z [15] [16] [17] [18] [19]
- Ionic Charge, 4 [15] [16] [17]
- Natural Occurrence, 5 [14] [15] [16] [17] [18]
- Additional Properties, 6 [15] [16] [17]
- State of Matter/Phase at Standard Temperature and Pressure, 7 [14]
- Groups [15] [16] [17]
- Electron Configuration Blocks [15] [16] [17]

Diagram Sheet

Companion Sheet



Analytic Datasheets

D2, D3, D5, D6, D7 and D8 are analytic datasheets.

RADIOACTIVE DECAY MODES (D8)

Decay Mode	Symbol	Equation	Nucleus Changes
Alpha Emission	α	${}^A_ZX \rightarrow {}^{A-4}_{Z-2}X + {}^4_2\alpha$	$(A-4, Z-2)$
Proton Emission 2-Proton Emission	p $2p$	${}^A_ZX \rightarrow {}^{A-1}_{Z-1}X + p$ ${}^A_ZX \rightarrow {}^{A-2}_{Z-2}X + 2p$	$(A-1, Z-1)$ $(A-2, Z-2)$
Neutron Emission 2-Neutron Emission	n $2n$	${}^A_ZX \rightarrow {}^{A-1}_ZX + n$ ${}^A_ZX \rightarrow {}^{A-2}_ZX + 2n$	$(A-1, Z)$ $(A-2, Z)$
Electron Capture	ε	${}^A_ZX + {}^0_{-1}e \rightarrow {}^{A-1}_{Z-1}X + {}^0_0\nu_e$	$(A, Z-1)$
Positron Emission	e^+	${}^A_ZX \rightarrow {}^{A-1}_ZX + e^+ + {}^0_0\nu_e$	$(A, Z-1)$
Beta-Plus Decay	β^+	$\beta^+ = \varepsilon + e^+$ (Combined rate of ε and e^+)	Variable
Beta-Minus Decay	β^-	${}^A_ZX \rightarrow {}^{A+1}_{Z+1}X + {}^0_{-1}e + {}^0_0\bar{\nu}_e$	$(A, Z+1)$
Double Beta-Minus Decay	$2\beta^-$	${}^A_ZX \rightarrow {}^{A+2}_{Z+2}X + 2 {}^0_{-1}e + 2 {}^0_0\bar{\nu}_e$	$(A, Z+2)$
Double Beta-Plus Decay	$2\beta^+$	${}^A_ZX \rightarrow {}^{A-2}_{Z-2}X + 2 e^+ + 2 {}^0_0\nu_e$	$(A, Z-2)$
Beta-Minus-Delayed Neutron Emission	β^-n	${}^A_ZX \rightarrow {}^{A+1}_{Z+1}X + {}^0_{-1}e + {}^0_0\bar{\nu}_e$ ${}^{A+1}_{Z+1}X \rightarrow {}^{A+1}_{Z+1}X + {}^1_0n$	$(A-1, Z+1)$
Beta-Minus-Delayed 2-Neutron Emission	β^-2n	${}^A_ZX \rightarrow {}^{A+1}_{Z+1}X + {}^0_{-1}e + {}^0_0\bar{\nu}_e$ ${}^{A+1}_{Z+1}X \rightarrow {}^{A+1}_{Z+1}X + 2 {}^1_0n$	$(A-2, Z+1)$
Beta-Minus-Delayed 3-Neutron Emission	β^-3n	${}^A_ZX \rightarrow {}^{A+1}_{Z+1}X + {}^0_{-1}e + {}^0_0\bar{\nu}_e$ ${}^{A+1}_{Z+1}X \rightarrow {}^{A+1}_{Z+1}X + 3 {}^1_0n$	$(A-3, Z+1)$
Beta-Plus-Delayed Proton Emission	β^+p	${}^A_ZX \rightarrow {}^{A+1}_{Z+1}X + e^+ + {}^0_0\nu_e$ ${}^{A+1}_{Z+1}X \rightarrow {}^{A+1}_{Z+1}X + p$	$(A-1, Z-2)$
Beta-Plus-Delayed 2-Proton Emission	β^+2p	${}^A_ZX \rightarrow {}^{A+1}_{Z+1}X + e^+ + {}^0_0\nu_e$ ${}^{A+1}_{Z+1}X \rightarrow {}^{A+1}_{Z+1}X + 2p$	$(A-2, Z-3)$
Beta-Plus-Delayed 3-Proton Emission	β^+3p	${}^A_ZX \rightarrow {}^{A+1}_{Z+1}X + e^+ + {}^0_0\nu_e$ ${}^{A+1}_{Z+1}X \rightarrow {}^{A+1}_{Z+1}X + 3p$	$(A-3, Z-4)$

Analytic Sheet

Decay Mode	Symbol	Equation	Nucleus Changes
Beta-Minus-Delayed Alpha Emission	$\beta^-\alpha$	${}^A_ZX \rightarrow {}^{A-4}_{Z-2}X + {}^4_2\alpha + {}^0_{-1}e + {}^0_0\bar{\nu}_e$	$(A-4, Z-1)$
Beta-Plus-Delayed Alpha Emission	$\beta^+\alpha$	${}^A_ZX \rightarrow {}^{A-4}_{Z-2}X + {}^4_2\alpha + e^+ + {}^0_0\nu_e$ ${}^{A-4}_{Z-2}X \rightarrow {}^{A-4}_{Z-2}X + {}^4_2\alpha$	$(A-4, Z-3)$
Beta-Minus-Delayed Deuteron Emission	β^-d	${}^A_ZX \rightarrow {}^{A-2}_{Z-1}X + {}^2_1d + {}^0_{-1}e + {}^0_0\bar{\nu}_e$ ${}^{A-2}_{Z-1}X \rightarrow {}^{A-2}_{Z-1}X + d$	$(A-2, Z)$
Beta-Minus-Delayed Triton Emission	β^-t	${}^A_ZX \rightarrow {}^{A-3}_{Z-2}X + {}^3_1t + {}^0_{-1}e + {}^0_0\bar{\nu}_e$ ${}^{A-3}_{Z-2}X \rightarrow {}^{A-3}_{Z-2}X + t$	$(A-3, Z)$
Internal (Isomeric) Transition	IT	${}^A_mZX \rightarrow {}^A_gX + \gamma$	(A, Z)
Spontaneous Fission	SF	Variable	Variable
Beta-Plus-Delayed Fission	β^+SF	${}^A_ZX \rightarrow {}^{A-1}_{Z-1}X + e^+ + {}^0_0\nu_e$ Variable	Variable
Beta-Minus-Delayed Fission	β^-SF	${}^A_ZX \rightarrow {}^{A+1}_{Z+1}X + {}^0_{-1}e + {}^0_0\bar{\nu}_e$ Variable	Variable
Heavy Cluster Emission Cluster Decay	${}^AX_{CD}$	Variable	Variable

- Sources:
- Decay Mode ^[1]
 - Symbol ^{[1][2]}
 - Equation^{[2][3]}
 - Nucleus Changes ^{[1][2]}

Analytic Sheet with Companion Information



The First Edition

- The first edition is the initial release of a set of datasheets.
- Set 1's first edition will include D1, D2, D4, D5, D6, D7, D8 and a companion sources booklet.
- D3 will not be released until a later date.
 - This is because of the large size of the datasheet.
 - There are currently 3368 nuclides listed of which only 13.2% have been researched (443).
 - Latest estimates indicate that it would take a minimum of 144 hours split across 24 days (working 6-hour days) to complete the datasheet.
- The first edition of set 1 will be released by 2023.



Finally...

- The D-series will be subject to updates whenever new data is published.
- To enable this contingency, the latest version of every datasheet can be found on the SkinnerScience website.
- Furthermore, a new edition of each set will be released when enough data has changed to achieve a significant milestone.
- Many more sets of datasheets may follow in the D-series as new areas are found to document.



Questions?

Don't be shy now.





Thank You

Now you can blow things up with more data.

