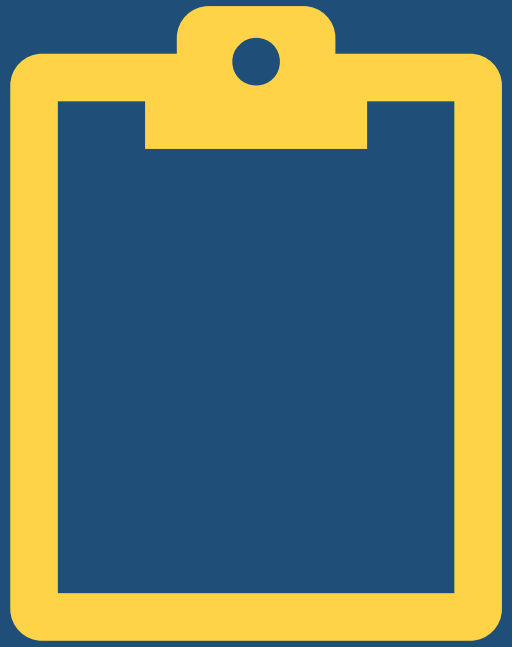
D-Series Set 1

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.

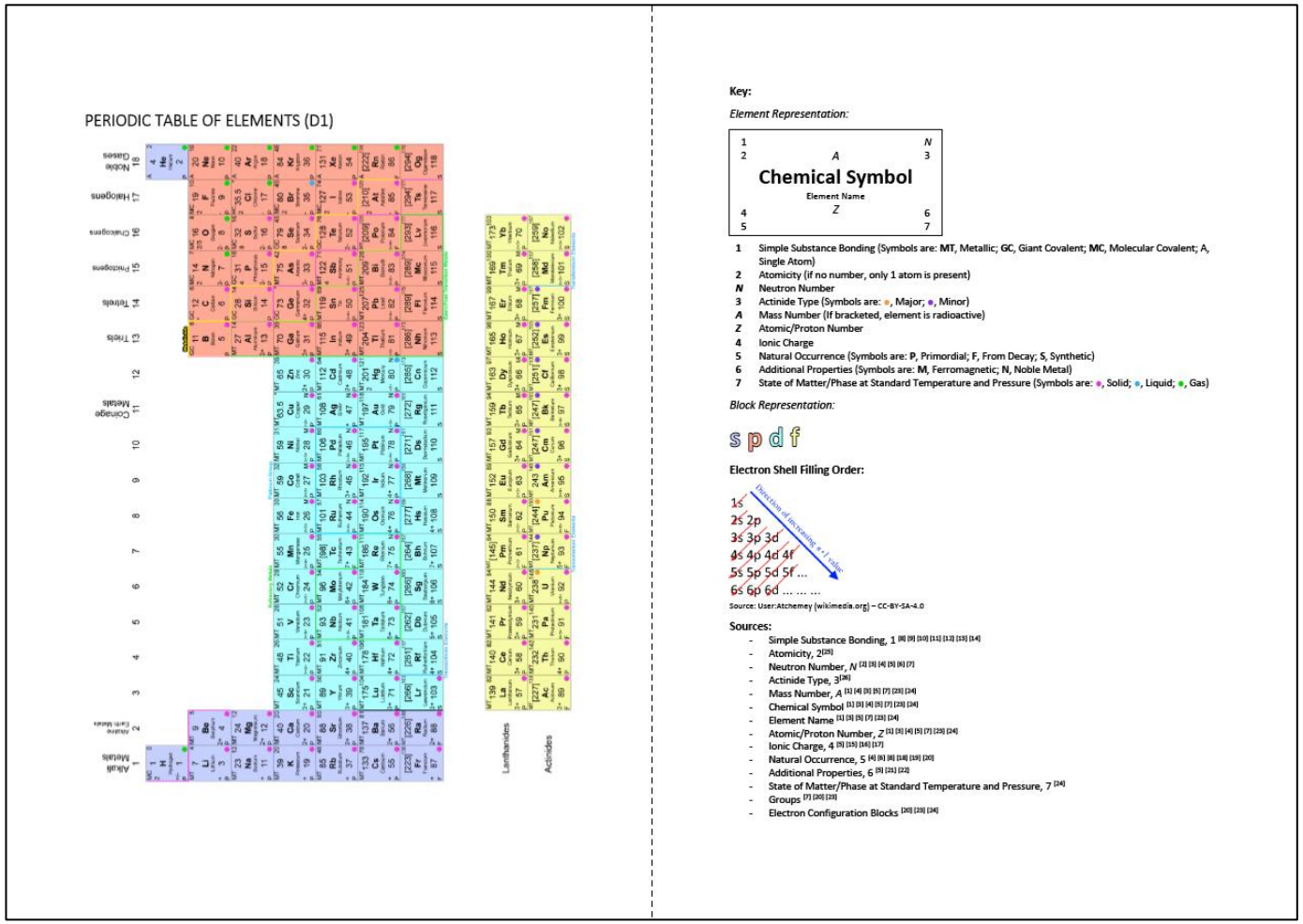


Diagram Sheet

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	${}^{A}_{Z}X \rightarrow {}^{A-4}_{Z-2}X + {}^{4}_{2}\alpha$	$(A-4, Z-2)$
Proton Emission 2-Proton Emission	p $2p$	${}^{A}_{Z}X \rightarrow {}^{A-1}_{Z-1}X + {}^{1}_{1}p$ ${}^{A}_{Z}X \rightarrow {}^{A-2}_{Z-2}X + 2{}^{1}_{1}p$	$(A-1, Z-1)$ $(A-2, Z-2)$
Neutron Emission 2-Neutron Emission	n $2n$	${}^{A}_{Z}X \rightarrow {}^{A-1}_{Z}X + {}^{1}_{0}n$ ${}^{A}_{Z}X \rightarrow {}^{A-2}_{Z}X + 2{}^{1}_{0}n$	$(A-1, Z)$ $(A-2, Z)$
Electron Capture	ε	${}^{A}_{Z}X + {}^{0}_{-1}e \rightarrow {}^{A}_{Z-1}X + {}^{0}_{0}\nu_e$	$(A, Z-1)$
Positron Emission	e^+	${}^{A}_{Z}X \rightarrow {}^{A}_{Z-1}X + {}^{0}_{+1}e + {}^{0}_{0}\nu_e$	$(A, Z-1)$
Beta-Plus Decay	β^+	$\beta^+ = \varepsilon + e^+$ (Combined rate of ε and e^+)	Variable
Beta-Minus Decay	β^-	${}^{A}_{Z}X \rightarrow {}^{A}_{Z+1}X + {}^{0}_{-1}e + {}^{0}_{0}\overline{\nu}_e$	$(A, Z+1)$
Double Beta-Minus Decay	$2\beta^-$	${}^{A}_{Z}X \rightarrow {}^{A}_{Z+2}X + 2{}^{0}_{-1}e + 2{}^{0}_{0}\overline{\nu}_e$	$(A, Z+2)$
Double Beta-Plus Decay	$2\beta^+$	${}^{A}_{Z}X \rightarrow {}^{A}_{Z-2}X + 2{}^{0}_{+1}e + 2{}^{0}_{0}\nu_e$	$(A, Z-2)$
Beta-Minus-Delayed Neutron Emission	$\beta^- n$	${}^{A}_{Z}X \rightarrow {}^{A}_{Z+1}X + {}^{0}_{-1}e + {}^{0}_{0}\overline{\nu}_e$ ${}^{A}_{Z+1}X \rightarrow {}^{A-1}_{Z+1}X + {}^{1}_{0}n$	$(A-1, Z+1)$
Beta-Minus-Delayed 2-Neutron Emission	$\beta^- 2n$	${}^{A}_{Z}X \rightarrow {}^{A}_{Z+1}X + {}^{0}_{-1}e + {}^{0}_{0}\overline{\nu}_e$ ${}^{A}_{Z+1}X \rightarrow {}^{A-1}_{Z+1}X + 2{}^{1}_{0}n$	$(A-2, Z+1)$
Beta-Minus-Delayed 3-Neutron Emission	$\beta^- 3n$	${}^{A}_{Z}X \rightarrow {}^{A}_{Z+1}X + {}^{0}_{-1}e + {}^{0}_{0}\overline{\nu}_e$ ${}^{A}_{Z+1}X \rightarrow {}^{A-1}_{Z+1}X + 3{}^{1}_{0}n$	$(A-3, Z+1)$
Beta-Plus-Delayed Proton Emission	$\beta^+ p$	${}^{A}_{Z}X \rightarrow {}^{A}_{Z-1}X + {}^{0}_{+1}e + {}^{0}_{0}\nu_e$ ${}^{A}_{Z-1}X \rightarrow {}^{A-1}_{Z-2}X + {}^{1}_{1}p$	$(A-1, Z-2)$
Beta-Plus-Delayed 2-Proton Emission	$\beta^+ 2p$	${}^{A}_{Z}X \rightarrow {}^{A}_{Z-1}X + {}^{0}_{+1}e + {}^{0}_{0}\nu_e$ ${}^{A}_{Z-1}X \rightarrow {}^{A-2}_{Z-3}X + 2{}^{1}_{1}p$	$(A-2, Z-3)$
Beta-Plus-Delayed 3-Proton Emission	$\beta^+ 3p$	${}^{A}_{Z}X \rightarrow {}^{A}_{Z-1}X + {}^{0}_{+1}e + {}^{0}_{0}\nu_e$ ${}^{A}_{Z-1}X \rightarrow {}^{A-3}_{Z-4}X + 3{}^{1}_{1}p$	$(A-3, Z-4)$

Analytic Sheet

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

Sources:

- Decay Mode [1]
- Symbol [1] [2]
- Equation [2] [3]
- Nucleus Changes [2] [3]

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.