

PDF-4+ Tools and Searches



PDF-4+ 2023

The PDF-4+ 2023 database is powered by our integrated search display software. PDF-4+ 2023 boasts 80 search selections coupled with 134 display fields resulting in a nearly limitless choice of data mining options. This quick tutorial will introduce you to the basics of PDF-4+ filters available to you to refine your search.

Getting Started: The Toolbar

Search Window: Overview of Search Classifications

Data Mining Basics

Search Example

Preferences Module

PDF Data Card

Launch Screen

This will be the opening screen when you have correctly opened PDF-4+ 2023.

PDF-4+ 2023
File Window Help

Open PDF Cards Preferences Search History Results Composition Graph Steve + Microanalysis

Search

Subfile

- Custom PDF Set
 - Alkaloid
 - Amino Acid, Peptide & Complex
 - Battery Material
 - Bioactive
 - No Subclass
 - Depressant
 - Narcotic
 - Pesticide & Antimicrobial

Environment

- ☐ Ambient
- ☐ Non-ambient
 - ☐ Temp.
 - ☐ Press.
 - ☐ Temp. & press.
- ☐ Atomic coordinates
- ☐ Raw diffraction data

Status

- ☒ Primary
- ☒ Alternate
- ☐ Deleted

Quality Mark

- ☒ Star
- ☒ Good
- ☒ Indexed
- ☒ Calculated
- ☒ Prototyping
- ☒ Minimal Acceptable
- ☒ Blank
- ☒ Low-Precision
- ☐ Hypothetical

Database

- ☐ ICDD (00)
- ☐ ICSD (01)
- ☐ CSD (02)
- ☐ NIST (03)
- ☐ LPF (04)
- ☐ ICDD Crystal Data (05)

Periodic Table

Formula/Name

Classifications

Crystallography

Modulated

Diffraction

Physical Properties

Reference

Comments

Boolean ☒ Boolean ☐ Yes/No/Maybe ☐ Composition list

And ☒ Or ☐ Not ☐ Grouping: ☒ And ☐ Or

Only ☐ Just ☐

Range Input

Global Operator

Search Reset Tab Reset All

Tool Bar

Primary Search Menu

Getting Started

PDF-4+ 2023

File Window Help

Open PDF Cards Preferences Search History Results Composition Graph Sieve+ Microanalysis

Select PDF Cards

PDF Number Sort by Most Recent

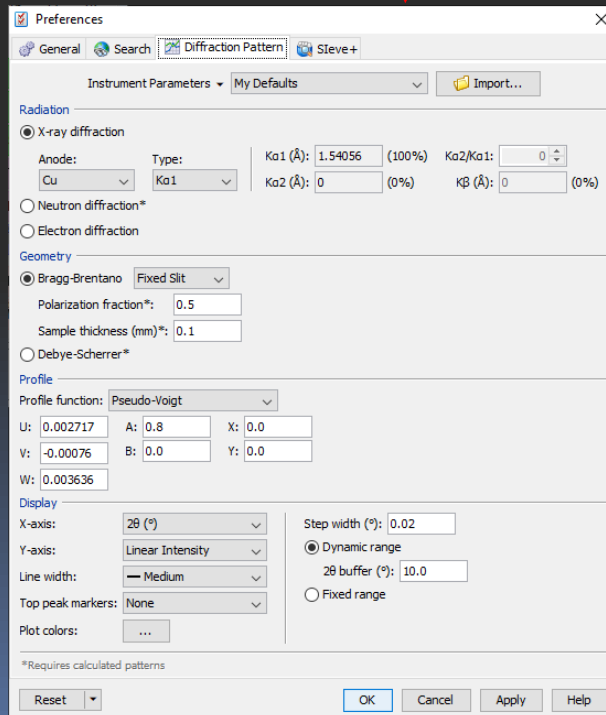
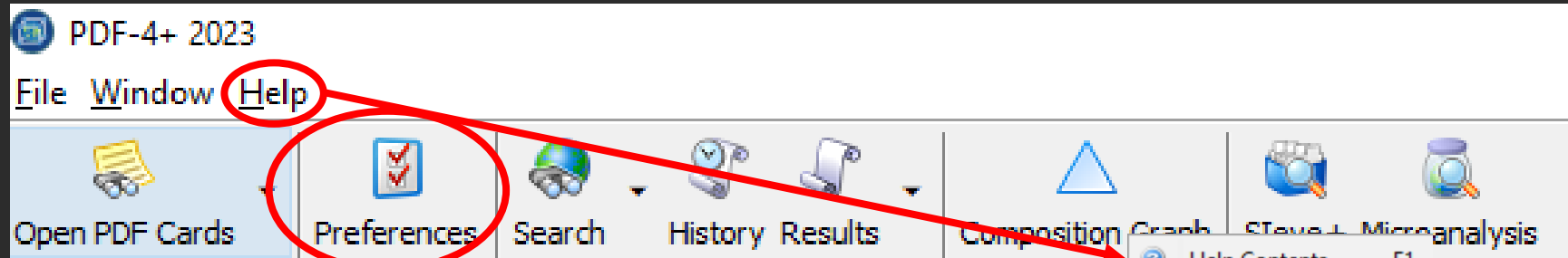
Mg S O ₄ · 7 H ₂ O
Magnesium Sulfate Hydrate
00-001-0399
Mg U O ₄
Magnesium Uranium Oxide
01-088-6702
Mg U ₂ O ₆
Magnesium Uranium Oxide
00-023-0408
Al ₂ O ₃
Aluminum Oxide
00-043-1484
2 Mg O · 3 Si O ₂ · 2 H ₂ O
Magnesium Silicate Hydrate
00-002-0035

Clear List Open PDF Card Cancel

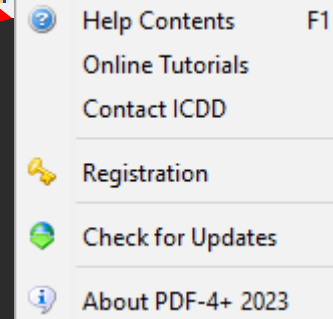
Open a known PDF card.

Navigate quickly to a recent PDF card.

Getting Started

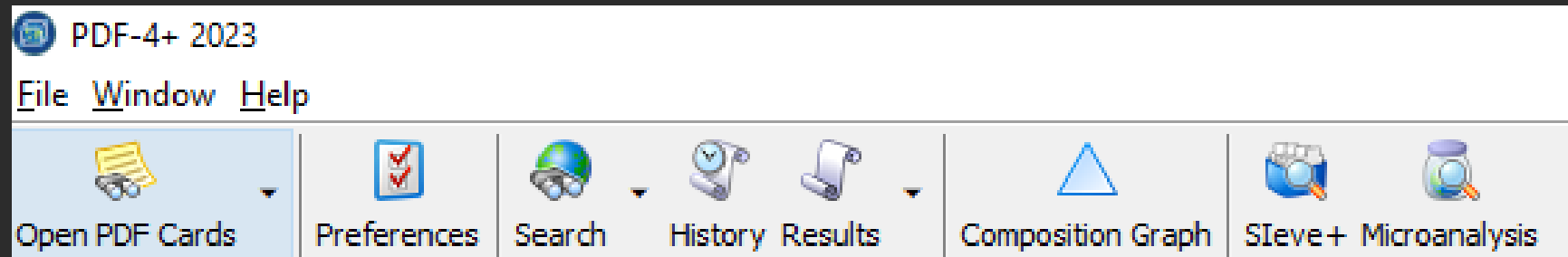


Customize Radiation, Geometry, Profile, Display settings and many more features of the PDF-4+.



Help information regarding use, support, license policy, and registration of the PDF-4+.

Tool Bar



Quick Navigation Icons



Open a PDF Card



Select Preferences Module



Open Search Window



Open History Window



Open Results Window



Composition Graph



Open Sieve+



Microanalysis

Primary Search Menu

The Search Window displays nine tabs. Each tab features multiple search criteria to allow you to data mine the PDF-4+. Searching the PDF-4+ is an iterative process that allows you to input user-defined criteria, view the results, and combine additional criteria to refine your results.

The screenshot displays the 'Search' window with the following sections:

- Subfile:** A tree view showing categories like Custom PDF Set, Alkaloid, Amino Acid, Peptide & Complex, Battery Material, Bioactive, No Subclass, Depressant, Narcotic, and Pesticide & Antimicrobial.
- Environment:** Checkboxes for Ambient, Non-ambient, Temp., Press., Temp. & press., Atomic coordinates, and Raw diffraction data.
- Status:** Checkboxes for Primary, Alternate, and Deleted.
- Quality Mark:** Radio buttons for Star, Good, Indexed, Calculated, Prototyping, Minimal Acceptable, Blank, Low-Precision, and Hypothetical.
- Database:** Checkboxes for ICDD (00), ICSD (01), CSD (02), NIST (03), LPF (04), and ICDD Crystal Data (05).
- Periodic Table:** A table with 18 columns and 7 rows, showing elements with their symbols and atomic numbers. Some elements are highlighted in green (H, Li, Be, Na, Mg, K, Ca, Sc, Ti, V, Cr, Mn, Fe, Co, Ni, Cu, Zn, Ga, Ge, As, Se, Br, Kr, Rb, Sr, Y, Zr, Nb, Mo, Tc, Ru, Rh, Pd, Ag, Cd, In, Sn, Sb, Te, I, Xe, Cs, Ba, Hf, Ta, W, Re, Os, Ir, Pt, Au, Hg, Tl, Pb, Bi, Po, At, Rn, Fr, Ra, Rf, Db, Sg, Bh, Hs, Mt, Ds, Rg, Cn, Nh, Fl, Mc, Lv, Ts, Og, La, Ce, Pr, Nd, Pm, Sm, Eu, Gd, Tb, Dy, Ho, Er, Tm, Yb, Lu, Ac, Th, Pa, U, Np, Pu, Am, Cm, Bk, Cf, Es, Fm, Md, No, Lr).
- Search Logic:** Radio buttons for Boolean, Yes/No/Maybe, and Composition list. Checkboxes for And, Or, Not, Only, and Just. A 'Grouping' section with '+' and '-' icons.
- Bottom Bar:** Search, Reset Tab, and Reset All buttons. A 'Range Input' dropdown and a 'Global Operator' dropdown.

Search Window

Subfiles/Database Filters

Search

Subfile

- Custom PDF Set
- Alkaloid
- Amino Acid, Peptide & Complex
- Battery Material
- Bioactive
 - No Subclass
- Depressant
- Narcotic
- Pesticide & Antimicrobial

Environment

- ☐ Ambient
- ☐ Non-ambient
 - ☐ Temp.
 - ☐ Press.
 - ☐ Temp. & press.
- ☐ Atomic coordinates
- ☐ Raw diffraction data

Status

- ☒ Primary
- ☒ Alternate
- ☐ Deleted

Quality Mark

- ☒ Star
- ☒ Good
- ☒ Indexed
- ☒ Calculated
- ☒ Prototyping
- ☒ Minimal Acceptable
- ☒ Blank
- ☒ Low-Precision
- ☐ Hypothetical

Database

- ☐ ICDD (00)
- ☐ ICSD (01)
- ☐ CSD (02)
- ☐ NIST (03)
- ☐ LPF (04)
- ☐ ICDD Crystal Data (05)

Periodic Table

Formula/Name

Classifications

Crystallography

Modulated

Diffraction

Physical Properties

Reference

Comments

Boolean ☒ Yes/No/Maybe ☐ Composition list

And ☒ Or ☐ Not

Grouping: ☒ And ☐ Or

Search Reset Tab Reset All

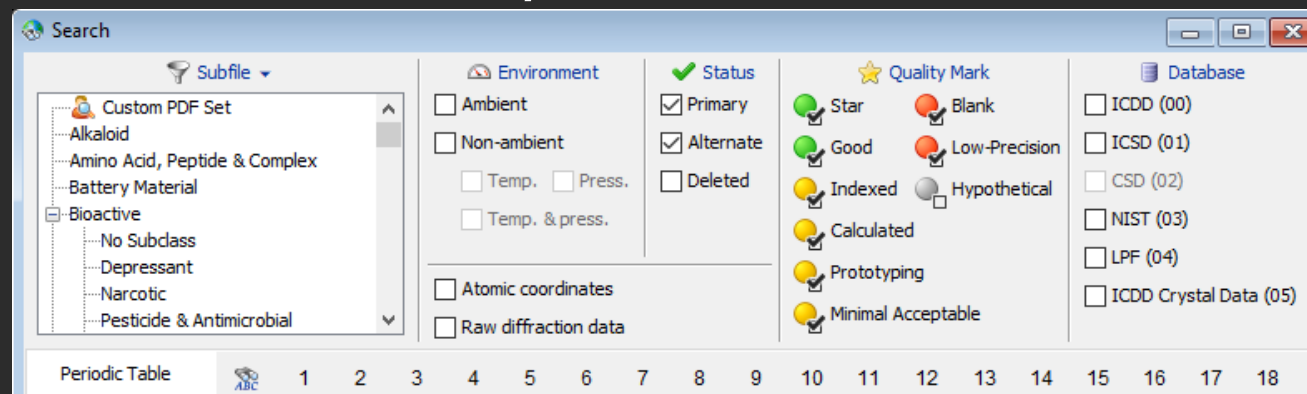
Range Input

Global Operator

Refine your search by selecting filters. Select criteria under Subfile, Environment, Status, Atomic Coordinates, Raw Diffraction Data (PD3), Quality Mark (QM), and Database.

Search Window

Subfiles/Database Filters



Filters:

Subfile – select filters related to assigned subfiles/subclass.

Environment – select filters related to the environment (especially temperature and pressure).

Atomic Coordinates – filters based on entries that contain atomic coordinates or a cross-reference to an entry with atomic coordinates.

Raw Diffraction Data (PD₃) – filters based on entries with high quality raw experimental data that can consist of nano-crystalline materials, semi-crystalline materials, or amorphous materials.

Status – select filters based on the status of the pattern, which can be Active, Deleted, Alternate, Rejected or Primary.

Quality Mark (QM) – select filters related to the quality evaluation assigned to the data.

Database – search the entire database or select the data entry source (i.e., ICDD (00) – ICDD's experimental patterns).

Search Window

Periodic Table Filters

The screenshot shows the ICDD Search Window with the following sections:

- Subfile:** Custom PDF Set, Alkaloid, Amino Acid, Peptide & Complex, Battery Material, Bioactive, No Subclass, Depressant, Narcotic, Pesticide & Antimicrobial.
- Environment:** Ambient, Non-ambient, Temp., Press., Temp. & press., Atomic coordinates, Raw diffraction data.
- Status:** Primary, Alternate, Deleted.
- Quality Mark:** Star, Good, Indexed, Calculated, Prototyping, Minimal Acceptable, Blank, Low-Precision, Hypothetical.
- Database:** ICDD (00), ICSD (01), CSD (02), NIST (03), LPF (04), ICDD Crystal Data (05).
- Periodic Table:** A table of elements with columns 1-18. Elements are color-coded: H (green), Li (yellow), Be (cyan), Na (yellow), Mg (cyan), K (yellow), Ca (cyan), Sc (blue), Ti (blue), V (blue), Cr (blue), Mn (blue), Fe (blue), Co (blue), Ni (blue), Cu (blue), Zn (blue), Ga (blue), Ge (blue), As (blue), Se (blue), Br (blue), Kr (blue), Rb (yellow), Sr (cyan), Y (blue), Zr (blue), Nb (blue), Mo (blue), Tc (blue), Ru (blue), Rh (blue), Pd (blue), Ag (blue), Cd (blue), In (blue), Sn (blue), Sb (blue), Te (blue), I (blue), Xe (blue), Cs (yellow), Ba (cyan), Hf (blue), Ta (blue), W (blue), Re (blue), Os (blue), Ir (blue), Pt (blue), Au (blue), Hg (blue), Tl (blue), Pb (blue), Bi (blue), Po (blue), At (blue), Rn (blue), Fr (yellow), Ra (cyan), Rf (blue), Db (blue), Sg (blue), Bh (blue), Hs (blue), Mt (blue), Ds (blue), Rg (blue), Cn (blue), Nh (blue), Fl (blue), Mc (blue), Lv (blue), Ts (blue), Og (blue), La (blue), Ce (blue), Pr (blue), Nd (blue), Pm (blue), Sm (blue), Eu (blue), Gd (blue), Tb (blue), Dy (blue), Ho (blue), Er (blue), Tm (blue), Yb (blue), Lu (blue), Ac (blue), Th (blue), Pa (blue), U (blue), Np (blue), Pu (blue), Am (blue), Cm (blue), Bk (blue), Cf (blue), Es (blue), Fm (blue), Md (blue), No (blue), Lr (blue).
- Search Options:** Boolean, Yes/No/Maybe, Composition list, And, Or, Not, Only, Just, Grouping: And, Or.
- Buttons:** Search, Reset Tab, Reset All, Range Input, Global Operator.

Refine your search by selecting filters based upon the elements in a material. Select elements individually (i.e., *H*, *He*, *Li*, etc.) or by group (i.e., *IA*, *Noble Gases*, *Period 1*, etc.).

Select the *Inner Operator* to combine the elements in the group using *Not*, *And*, *Or*, *Only* and *Just*.

Select the *Outer Operator* to combine element groups using *And* & *Or*.

Search Window

Periodic Table Filters

Search Window

Subfile

- Custom PDF Set
 - Alkaloid
 - Amino Acid, Peptide & Complex
 - Battery Material
 - Bioactive
 - No Subclass
 - Depressant
 - Narcotic
 - Pesticide & Antimicrobial

Environment

- Ambient
- Non-ambient
 - Temp.
 - Press.
 - Temp. & press.
- Atomic coordinates
- Raw diffraction data

Status

- Primary
- Alternate
- Deleted

Quality Mark

- Star
- Good
- Indexed
- Calculated
- Prototyping
- Minimal Acceptable
- Blank
- Low-Precision
- Hypothetical

Database

- ICDD (00)
- ICSD (01)
- CSD (02)
- NIST (03)
- LPF (04)

Periodic Table

Formula/Name

Classifications

Crystallography

Modulated

Diffraction

Physical Properties

Reference

Comments

Boolean ☒ Yes/No/Maybe ☐ Composition list

Switch to No

Search Reset Tab Reset All

Range Input

Global Operator

For the **Yes/No/Maybe** search, click an element to cycle through these three states:

- Yes** - This element must exist in the pattern (white)
- No** - This element must not exist in the pattern (black)
- Maybe** - This element may exist in the pattern (colored)

Search Window

Periodic Table Filters

Composition Diagram List - This lists all phases in a binary system (if two elements are selected), all phases in a ternary system (if three elements are selected), and all phases in a quaternary system (if four elements are selected). The phases are sorted by atomic fraction (using the empirical formula), going from one side of the phase diagram to the other side.

Select one or more phases from the list and click Search to view all of the PDF entries that have the selected empirical formula(s).

The screenshot shows the 'Search' window with the 'Periodic Table Filters' section. The 'Composition list' filter is selected, and a list of empirical formulas and hits is displayed on the right. The list includes:

Empirical Formula	Hits
Fe	131
Fe _{0.95} Ni _{0.05}	4
Fe _{0.9463} Ni _{0.0537}	1
Fe _{0.946} Ni _{0.054}	1
Fe _{0.9458} Ni _{0.0542}	1
Fe _{0.9441} Ni _{0.0559}	1
Fe _{0.9429} Ni _{0.0571}	1
Fe _{0.94} Ni _{0.06}	2
Fe _{0.9381} Ni _{0.0619}	1
Fe _{0.92} Ni _{0.08}	1
Fe _{0.916} Ni _{0.084}	24
Fe _{10.8} Ni	1
Fe _{0.91} Ni _{0.09}	2
Fe _{0.9} Ni _{0.1}	3
Fe _{0.8782} Ni _{0.1218}	2
Fe _{0.8782} Ni _{0.1218}	2

Search Window

Formula/Name

Search Window Interface:

- Subfile:** Custom PDF Set, Alkaloid, Amino Acid, Peptide & Complex, Battery Material, Bioactive, No Subclass, Depressant, Narcotic, Pesticide & Antimicrobial.
- Periodic Table**
- Formula/Name:** Formula (dropdown), Name, IMA No., Number of Elements (Low/High), Molecular Wt (g/mol) (Value/±Error), Composition (Element/Weight %/±Error).
- Environment:** Ambient, Non-ambient, Temp., Press., Temp. & press., Atomic coordinates, Raw diffraction data.
- Status:** Primary, Alternate, Deleted.
- Search Criteria:** Any Formula, Chemical Formula, Structural Formula, Empirical Formula, Refined Formula, Contains Elements, Contains Phrase Exactly, Not.
- Buttons:** Search, Reset Tab, Reset All, Range Input, Global Operator.

Refine your search by selecting filters based upon the elements in a material.

Chemical Formula – filters based on the molecular formula.

Structural Formula – filters on the chemical formula that shows how atoms are bonded to one another in a molecule.

Empirical Formula – filters on an element that has a particular atom count as expressed in the formula.

Refined Formula – filters based on a formula derived from the occupancies and site multiplicities of the elements in the atomic coordinates.

Number of Elements – filters on the total number of unique elements in a chemical formula.

Molecular Wt (g/mol) – filters based on molecular weight in g/mol

Composition – filters on the weight percent or atomic percent of the formula.

Search Window

Formula/Name

Search Window Interface:

- Subfile:** Custom PDF Set, Alkaloid, Amino Acid, Peptide & Complex, Battery Material, Bioactive, No Subclass, Depressant, Narcotic, Pesticide & Antimicrobial.
- Environment:** Ambient, Non-ambient, Temp., Press., Temp. & press., Atomic coordinates, Raw diffraction data.
- Status:** Primary, Alternate, Deleted.
- Quality Mark:** Star, Good, Indexed, Calculated, Prototyping, Minimal Acceptable, Blank, Low-Precision, Hypothetical.
- Database:** ICDD (00), ICSD (01), CSD (02), NIST (03), LPF (04), ICDD Crystal Data (05).
- Formula:** Any Formula, Name (dropdown).
- Name Filter Options:** Any Name, Compound Name, Mineral Name, Alternate Name, Zeolite Name, Contains Fragments, Contains Phrase, Exactly, Not.

Refine your search by selecting filters based upon the name or name fragment of a material.

Compound Name – filters based on the compound name.

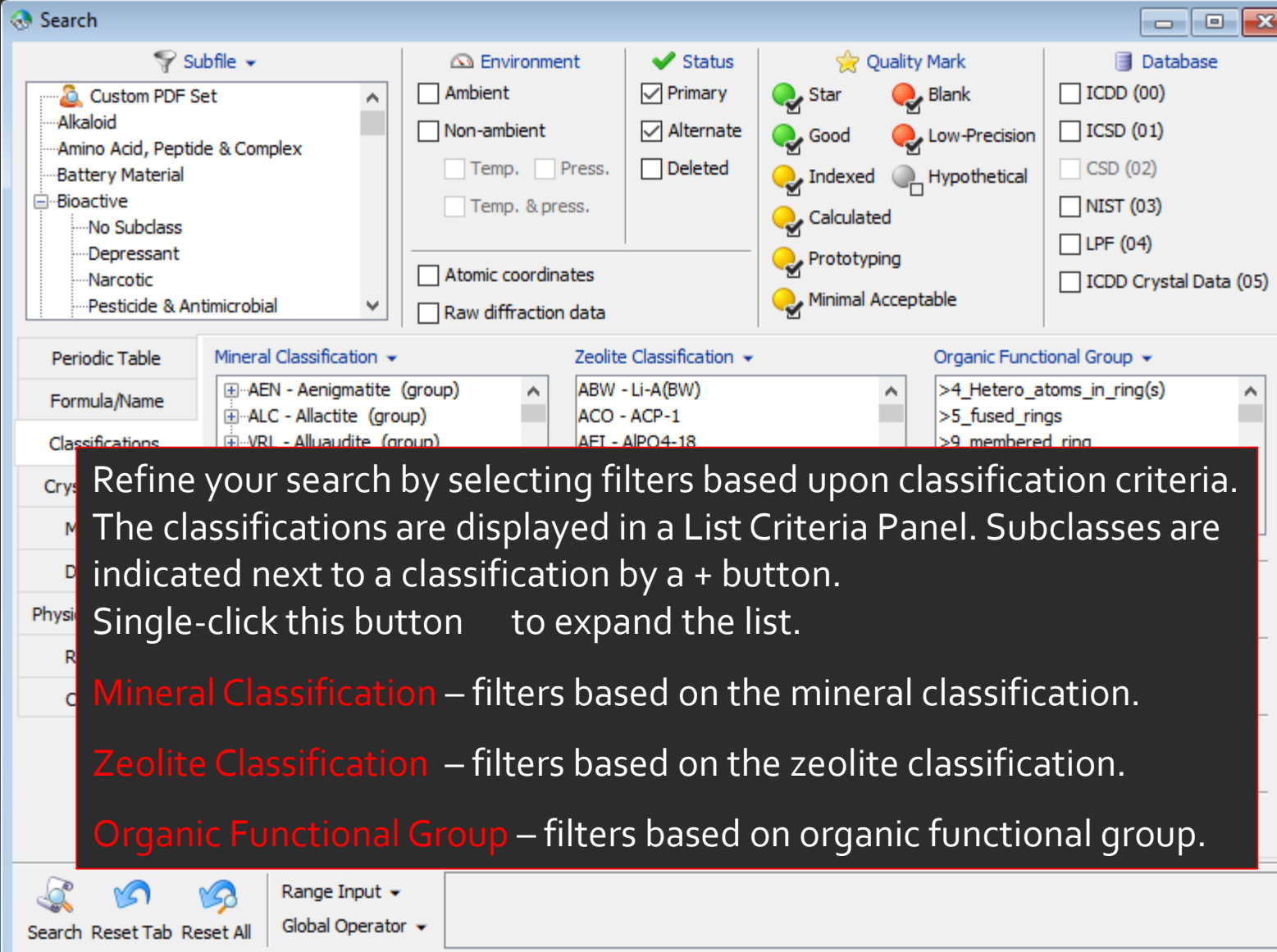
Mineral Name – filters based on the mineral name.

Alternate Name – filters based on another recognized name of the material.

Zeolite Name – filters based on the zeolite name.

Search Window

Classifications



The screenshot displays the ICDD Search Window interface. At the top, there's a 'Subfile' dropdown menu. Below it, a list of categories is shown, including 'Custom PDF Set', 'Alkaloid', 'Amino Acid, Peptide & Complex', 'Battery Material', 'Bioactive', 'No Subclass', 'Depressant', 'Narcotic', and 'Pesticide & Antimicrobial'. To the right, there are several filter sections: 'Environment' (Ambient, Non-ambient, Temp., Press., Temp. & press.), 'Status' (Primary, Alternate, Deleted), 'Quality Mark' (Star, Good, Indexed, Calculated, Prototyping, Minimal Acceptable, Blank, Low-Precision, Hypothetical), and 'Database' (ICDD (00), ICSD (01), CSD (02), NIST (03), LPF (04), ICDD Crystal Data (05)). Below these, there are three classification panels: 'Mineral Classification' (AEN - Aenigmatite (group), ALC - Allactite (group), VRI - Alluaudite (group)), 'Zeolite Classification' (ABW - Li-A(BW), ACO - ACP-1, AET - AlPO4-18), and 'Organic Functional Group' (>4_Hetero_atoms_in_ring(s), >5_fused_rings, >9_membered_ring). A text box is overlaid on the bottom right of the window, providing instructions on how to refine searches using these classification criteria.

Refine your search by selecting filters based upon classification criteria. The classifications are displayed in a List Criteria Panel. Subclasses are indicated next to a classification by a + button. Single-click this button to expand the list.

Mineral Classification – filters based on the mineral classification.

Zeolite Classification – filters based on the zeolite classification.

Organic Functional Group – filters based on organic functional group.

Search Window

Pearson Symbol Code

The screenshot shows the ICDD Search Window interface. The left sidebar contains a list of search criteria: Periodic Table, Formula/Name, Classifications, Crystallography, Modulated, Diffraction, Physical Properties, Reference, and Comments. The main search area is divided into several sections: Subfile (with a tree view including Custom PDF Set, Alkaloid, Amino Acid, Peptide & Complex, Battery Material, Bioactive, No Subclass, Depressant, Narcotic, and Pesticide & Antimicrobial), Environment (Ambient, Non-ambient, Temp., Press., Temp. & press., Atomic coordinates, Raw diffraction data), Status (Primary, Alternate, Deleted), Quality Mark (Star, Good, Indexed, Calculated, Prototyping, Minimal Acceptable, Blank, Low-Precision, Hypothetical), and Database (ICDD (00), ICSD (01), CSD (02), NIST (03), LPF (04), ICDD Crystal Data (05)). Below these are three classification lists: Mineral Classification (AEN - Aenigmatite (group), ALC - Allactite (group), VRL - Alluaudite (group), ALM - Alum (group), ALN - Alunite (supergroup)), Zeolite Classification (ABW - Li-A(BW), ACO - ACP-1, AEI - AlPO4-18, AEL - AlPO4-11, AEN - AlPO-EN3), and Organic Functional Group (>4_Hetero_atoms_in_ring(s), >5_fused_rings, >9_membered_ring, 1_Hetero_atom_in_ring(s), 1,2_dione__O=C-C=O). The bottom section contains filters for Pearson Symbol (With Hydrogen), Prototype Structure (Any Prototype Structure), Formula Type (ANX), and Wyckoff Sequence. Two red arrows point from text boxes to the 'With Hydrogen' and 'Any Prototype Structure' filters. The bottom status bar includes Search, Reset Tab, Reset All, Range Input, and Global Operator buttons.

Search Window

Subfile

- Custom PDF Set
- Alkaloid
- Amino Acid, Peptide & Complex
- Battery Material
- Bioactive
 - No Subclass
 - Depressant
 - Narcotic
 - Pesticide & Antimicrobial

Environment

- Ambient
- Non-ambient
 - Temp.
 - Press.
 - Temp. & press.
- Atomic coordinates
- Raw diffraction data

Status

- Primary
- Alternate
- Deleted

Quality Mark

- Star
- Good
- Indexed
- Calculated
- Prototyping
- Minimal Acceptable
- Blank
- Low-Precision
- Hypothetical

Database

- ICDD (00)
- ICSD (01)
- CSD (02)
- NIST (03)
- LPF (04)
- ICDD Crystal Data (05)

Periodic Table

Formula/Name

Classifications

Crystallography

Modulated

Diffraction

Physical Properties

Reference

Comments

Mineral Classification

- AEN - Aenigmatite (group)
- ALC - Allactite (group)
- VRL - Alluaudite (group)
- ALM - Alum (group)
- ALN - Alunite (supergroup)

Zeolite Classification

- ABW - Li-A(BW)
- ACO - ACP-1
- AEI - AlPO4-18
- AEL - AlPO4-11
- AEN - AlPO-EN3

Organic Functional Group

- >4_Hetero_atoms_in_ring(s)
- >5_fused_rings
- >9_membered_ring
- 1_Hetero_atom_in_ring(s)
- 1,2_dione__O=C-C=O

Pearson Symbol

With Hydrogen

Prototype Structure

Any Prototype Structure

Formula Type (ANX)

Wyckoff Sequence

Range Input

Global Operator

Search Reset Tab Reset All

Filters for Pearson Symbol Codes with and without Hydrogen.

Filters based on a user-constructed Pearson Symbol Code.

Search Window

Crystallography

The screenshot shows the 'Search' window in the ICDD software. The 'Crystallography' tab is selected in the left sidebar. The main area displays various search filters:

- Subfile:** Custom PDF Set, Alkaloid, Amino Acid, Peptide & Complex, Battery Material, Bioactive (No Subclass, Depressant, Narcotic, Pesticide & Antimicrobial).
- Environment:** Ambient, Non-ambient, Temp., Press., Temp. & press., Atomic coordinates, Raw diffraction data.
- Status:** Primary, Alternate, Deleted.
- Quality Mark:** Star, Good, Indexed, Calculated, Prototyping, Minimal Acceptable, Blank, Low-Precision, Hypothetical.
- Database:** ICDD (00), ICSD (01), CSD (02), NIST (03), LPF (04), ICDD Crystal Data (05).
- Crystal System:** Triclinic (Anorthic), Rhombohedral, Monoclinic, Hexagonal, Orthorhombic, Cubic, Tetragonal.
- Crystal (Symmetry Allowed):** Centrosymmetric, Non-centrosymmetric, Enantiomorphic, Pyro / Piezo (p), Optical Activity, Piezo (2nd Harm.).
- Space Group:** Space Group Symbol.
- Crystal Data:** Crystal Data, Reduced Cell, Author's Unit Cell, Supercell/Subcell (highlighted with a red circle).

A text box at the bottom of the window states: "The Crystallography tab displays four additional search tabs: *Crystal Data*, *Reduced Cell*, *Author's Cell*, and *Supercell/Subcell*. Refine your search by selecting filters based upon the structure of a material."

Search Window

Crystal Data

Search

Subfile

Custom PDF Set

- Alkaloid
- Amino Acid, Peptide & Complex
- Battery Material
- Bioactive
 - No Subclass
 - Depressant
 - Narcotic
 - Pesticide & Antimicrobial

Environment

Ambient

Non-ambient

Temp. Press.

Temp. & press.

Atomic coordinates

Raw diffraction data

Status

Primary

Alternate

Deleted

Quality Mark

Star

Good

Indexed

Calculated

Prototyping

Minimal Acceptable

Blank

Low-Precision

Hypothetical

Database

ICDD (00)

ICSD (01)

CSD (02)

NIST (03)

LPF (04)

ICDD Crystal Data (05)

Periodic Table

Formula/Name

Classifications

Crystallography

Modulated

Diffraction

Physical Properties

Reference

Comments

Crystal System

Triclinic (Anorthic)

Monoclinic

Orthorhombic

Tetragonal

Rhombohedral

Hexagonal

Cubic

Crystal (Symmetry Allowed)

Centrosymmetric

Non-centrosymmetric:

Enantiomorphic

Pyro / Piezo (p)

Optical Activity

Piezo (2nd Harm.)

AET

AET

Elements

Space Group

Space Group Symbol

Space Group Number

Aspect Symbol

Superspace Group Symbol

Contains Fragments

Contains Phrase

Exactly

Not

Unit Cell

Supercell

Angles (°)

Volume (Å³)

Axial Ratio

c/a: Value ±Error

a/b: Value ±Error

c/b: Value ±Error

Search Reset Tab Reset All

Global Operator

Filters based on the space group symbol according to nomenclature defined by the author.

Filters based on the superspace group symbol (for modulated structures only).

Filters based on the international space group numbers (1-230).

Filters based on the aspect symbol according to nomenclature defined by the author.

Search Window

Crystal Data

Search

Subfile

- Custom PDF Set
 - Alkaloid
 - Amino Acid, Peptide & Complex
 - Battery Material
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- ☐ NIST (03)
- ☐ LPF (04)
- ☐ ICDD Crystal Data (05)

Periodic Table

Formula/Name

Classifications

Crystallography

Modulated

Diffraction

Physical Properties

Reference

Comments

Crystal System

- ☐ Triclinic (Anorthic)
- ☐ Monoclinic
- ☐ Orthorhombic
- ☐ Tetragonal
- ☐ Rhombohedral
- ☐ Hexagonal
- ☐ Cubic

Crystal (Symmetry Allowed)

- ☐ Centrosymmetric
- ☐ Non-centrosymmetric:
 - ☐ Enantiomorphic
 - ☐ Pyro / Piezo (p)
 - ☐ Optical Activity
 - ☐ Piezo (2nd Harm.)

AET

AET

Elements

Space Group

Space Group Symbol

Crystal Data

Reduced Cell

Author's Unit Cell

Supercell/Subcell

Axis (Å)

a: Value ±Error

b: Value ±Error

c: Value ±Error

Angles (°)

α: Value ±Error

β: Value ±Error

γ: Value ±Error

Volume (Å³)

Value ±Error

Axial Ratio

c/a: Value ±Error

c/b: Value ±Error

c/c: Value ±Error

Filters based on the lengths of the three axes of the crystal data.

Filters based on the volume of the crystal data.

Range Input

Global Operator

Search Reset Tab Reset All

ICDD

INTERNATIONAL CENTER FOR DIFFRACTION DATA

ISO 9001:2015

QUALITY MANAGEMENT SYSTEM CERTIFIED

BY DEKRA

CEP-10

110409-01

Search Window

Reduced Cell

The reduced cell is a unique, primitive cell based on the three shortest lattice translations.

The screenshot shows the 'Search' window with the 'Reduced Cell' tab selected. The window is divided into several sections:

- Subfile:** A tree view showing categories like 'Custom PDF Set', 'Alkaloid', 'Amino Acid, Peptide & Complex', 'Battery Material', 'Bioactive', 'No Subclass', 'Depressant', 'Narcotic', and 'Pesticide & Antimicrobial'.
- Environment:** Checkboxes for 'Ambient', 'Non-ambient', 'Temp.', 'Press.', 'Temp. & press.', 'Atomic coordinates', and 'Raw diffraction data'.
- Status:** Checkboxes for 'Primary', 'Alternate', and 'Deleted'.
- Quality Mark:** Checkboxes for 'Star', 'Good', 'Indexed', 'Calculated', 'Prototyping', 'Minimal Acceptable', 'Blank', 'Low-Precision', and 'Hypothetical'.
- Database:** Checkboxes for 'ICDD (00)', 'ICSD (01)', 'CSD (02)', 'NIST (03)', 'LPF (04)', and 'ICDD Crystal Data (05)'.
- Crystal System:** Checkboxes for 'Triclinic (Anorthic)', 'Rhombohedral', 'Monoclinic', 'Hexagonal', 'Orthorhombic', 'Cubic', and 'Tetragonal'.
- Crystal (Symmetry Allowed):** Checkboxes for 'Centrosymmetric', 'Non-centrosymmetric', 'Enantiomorphic', 'Pyro / Piezo (p)', 'Optical Activity', and 'Piezo (2nd Harm.)'.
- Space Group:** A dropdown menu for 'Space Group Symbol'.
- Crystal Data:** A tabbed interface with 'Reduced Cell' selected. It contains input fields for 'Axis (Å)' (a, b, c), 'Angles (°)' (α, β, γ), and 'Volume (Å³)' (Value, ±Error).
- Search Bar:** A 'Range Input' field with a 'Global Operator' dropdown.

Two red boxes highlight specific features:

- A box on the left side of the window contains the text: "The reduced cell is a unique, primitive cell based on the three shortest lattice translations."
- A box at the bottom right of the 'Reduced Cell' tab contains the text: "Filters based on the volume of the reduced cell."
- A box at the bottom of the 'Reduced Cell' tab contains the text: "Filters based on the lengths of the three axes of the reduced cell."

Search Window

Author's Cell

Search

Subfile

Custom PDF Set

- Alkaloid
- Amino Acid, Peptide & Complex
- Battery Material
- Bioactive
 - No Subclass
 - Depressant
 - Marcotic

Environment

Ambient

Non-ambient

Temp. Press.

Temp. & press.

Atomic coordinates

Status

Primary

Alternate

Deleted

Quality Mark

Star

Good

Indexed

Calculated

Prototyping

Blank

Low-Precision

Hypothetical

Database

ICDD (00)

ICSD (01)

CSD (02)

NIST (03)

LPF (04)

ICDD Crystal Data (05)

Convert Cell

Crystal System: Triclinic (Anorthic)

Bravais Lattice: Primitive

Convert to Crystal Data

Convert to Reduced Cell

Convert

Cancel

Formula/Name

Classifications

Crystallography

Modulated

Diffraction

Physical Properties

Reference

Comments

Space Group

Space Group Symbol

Crystal Data

Reduced Cell

Author's Unit Cell

Supercell/Subcell

Axis (Å)

Angles (°)

Volume (Å³)

Axial Ratio

a: Value ±Error

b: Value ±Error

c: Value ±Error

α: Value ±Error

β: Value ±Error

γ: Value ±Error

Value ±Error

Molecular/f.u. Volume

c/a: Value ±Error

a/b: Value ±Error

c/b: Value ±Error

Filters based on the lengths of the three axes of the author's cell.

Filters based on the volume of the author's unit cell.

Convert Cell form used to convert Author's Unit Cell Axis/Volume data to Crystal or Reduced Cell Axis/Volume data for searching.

Search Reset Tab Reset All

Range Input

Global Operator

Search Window

Supercell/Subcell

This search uses derivative lattices (including superlattices and sublattices) generated from the given primary lattices. The volume of superlattices $|Q|$ can be between 1 and 9 and volume of sublattices $|X|$ can be changed from 1/1 to 1/9. Derivative matrices are generated based on the selected volumes. Multiplying derivative matrices by the primary lattices gives derivative lattices, which are then transformed to reduced lattices for searching.

The screenshot shows the ICDD Search window with the 'Supercell/Subcell' tab selected. A red arrow points from the text box to this tab. The window is divided into several sections:

- Subfile:** A list of files including 'Custom PDF Set', 'Alkaloid', and 'Amino Acid, Peptide & Complex'.
- Environment:** Checkboxes for 'Ambient', 'Non-ambient', 'Temp.', 'Press.', 'Temp. & press.', 'Atomic coordinates', and 'Raw diffraction data'.
- Status:** Checkboxes for 'Primary', 'Alternate', and 'Deleted'.
- Quality Mark:** Radio buttons for 'Star', 'Good', 'Indexed', 'Calculated', 'Prototyping', 'Minimal Acceptable', 'Blank', 'Low-Precision', and 'Hypothetical'.
- Database:** Checkboxes for 'ICDD (00)', 'ICSD (01)', 'CSD (02)', 'NIST (03)', 'LPF (04)', and 'ICDD Crystal Data (05)'.
- Crystal System:** Checkboxes for 'Triclinic (Anorthic)', 'Monoclinic', 'Orthorhombic', 'Tetragonal', 'Rhombohedral', 'Hexagonal', and 'Cubic'.
- Crystal (Symmetry Allowed):** Checkboxes for 'Centrosymmetric', 'Non-centrosymmetric', 'Enantiomorphic', 'Pyro / Piezo (p)', 'Optical Activity', and 'Piezo (2nd Harm.)'.
- AET:** A text input field with a dropdown menu.
- Space Group:** A text input field with a dropdown menu.
- Crystal Data:** A section with tabs for 'Crystal Data', 'Reduced Cell', 'Author's Unit Cell', and 'Supercell/Subcell'. The 'Supercell/Subcell' tab is active, showing input fields for 'Axis (Å)' (a, b, c) and 'Angles (°)' (α, β, γ), each with a 'Value' and '±Error' field. It also has radio buttons for 'Supercell' and 'Subcell', and a 'Volume Ratio' field with two dropdown menus set to '1'.
- Search:** A section at the bottom with 'Search', 'Reset Tab', and 'Reset All' buttons, and a 'Range Input' and 'Global Operator' field.

Search Window

Modulated

Search

Subfile

- Custom PDF Set
- Alkaloid
- Amino Acid, Peptide & Complex
- Battery Material
- Bioactive
 - No Subclass
 - Depressant
 - Narcotic
 - Pesticide & Antimicrobial

Environment

- ☐ Ambient
- ☐ Non-ambient
 - ☐ Temp.
 - ☐ Press.
 - ☐ Temp. & press.
- ☐ Atomic coordinates
- ☐ Raw diffraction data

Status

- ☒ Primary
- ☒ Alternate
- ☐ Deleted

Quality Mark

- ☒ Star
- ☒ Blank
- ☒ Prototyping
- ☒ Minimal Acceptable

Database

- ☐ ICDD (00)
- ☐ ICSD (01)
- ☐ ICDD Crystal Data (05)

Periodic Table

Formula/Name

Classifications

Crystallography

Modulated

Diffraction

Physical Properties

Reference

Comments

Modulated Dimension

- ☐ 3 + 1d
- ☐ 3 + 2d
- ☐ 3 + 3d

Subsystems

- ☐ Modulated structure (one subsystem)
- ☐ Composite structure (multiple subsystems)

Search Reset Tab Reset All

Range Input

Global Operator

Filters based on the number of dimensions used to describe the modulation where "3 + 1d", "3 + 2d", "3 + 3d" indicate one, two, and three additional dimensions respectively.

Filters patterns based on the number of subsystems present in the structure. Composite structures have more than one subsystem.

Search Window

Diffraction

Search Window

Subfile

- Custom PDF Set
 - Alkaloid
 - Amino Acid, Peptide & Complex
 - Battery Material
 - Bioactive
 - No Subclass
 - Depressant
 - Narcotic
 - Pesticide & Antimicrobial

Environment

- ☐ Ambient
- ☐ Non-ambient
 - ☐ Temp.
 - ☐ Press.
 - ☐ Temp. & press.
- ☐ Atomic coordinates
- ☐ Raw diffraction data

Status

- ☒ Primary
- ☒ Alternate
- ☐ Deleted

Quality Mark

- ☒ Star
- ☒ Good
- ☒ Indexed
- ☒ Calculated
- ☒ Prototyping
- ☒ Minimal Acceptable
- ☒ Blank
- ☒ Low-Precision
- ☐ Hypothetical

Database

- ☐ ICDD (00)
- ☐ ICSD (01)
- ☐ CSD (02)
- ☐ NIST (03)
- ☐ LPF (04)
- ☐ ICDD Crystal Data (05)

Periodic Table

Formula/Name

Classifications

Crystallography

Modulated

Diffraction

Physical Properties

Reference

Comments

Radiation: ☒ X-ray/Electron ☐ CW neutron

Strong Line (Å)

D1 D2 D3

Value Value Value ±Error

Long Line (Å)

L1 L2 L3

Value Value Value ±Error

Reported Intensity

- ☐ Integrated intensities
- ☐ Peak intensities

I/I-corundum

Value ±Error

R-factor

Value ±Error

Smith-Snyder Figure of Merit

Value ±Error

Temperature of Data Collection (K)

Value ±Error

Pressure of Data Collection (GPa)

Value ±Error

Search Reset Tab Reset All

Range Input

Global Operator

Filters based on the ratio of the intensity of the strongest line of the pattern to the intensity of the strongest line of corundum in a 50/50 weight mixture.

Filters based on the SS/FOM. The figure of merit generally used is that reported by Smith & Snyder, which indicates the completeness & accuracy of measured interplanar spacings.

Search Window

Physical Properties

Search

Subfile

Custom PDF Set

- Alkaloid
- Amino Acid, Peptide & Complex
- Battery Material
- Bioactive
 - No Subclass
 - Depressant
 - Narcotic
 - Pesticide & Antimicrobial

Environment

Ambient

Non-ambient

Temp. Press.

Temp. & press.

Atomic coordinates

Raw diffraction data

Status

Primary

Alternate

Deleted

Quality Mark

Star

Good

Indexed

Calculated

Prototyping

Minimal Acceptable

Blank

Low-Precision

Hypothetical

Database

ICDD (00)

ICSD (01)

CSD (02)

NIST (03)

LPF (04)

ICDD Crystal Data (05)

Periodic Table

Formula/Name

Classifications

Crystallography

Modulated

Diffraction

Physical Properties

Reference

Comments

Melting Point (K)

Value

±Error

Density (g/cm³)

Value

±Error

Measured density

Calculated density

Property sheet

Topology

Topology vdW Volume (Å³)

Value

±(%)

Topology Total Porosity (Å)

Value

±(%)

Color

Black

Blue

Brown

Color Missing

Colorless

Filters based on the measured, calculated or structural density of the material.

Filters based on the melting point. Specify degrees Celsius, Kelvin or Fahrenheit by selecting from the drop down menu.

Range Input

Global Operator

Search

Reset Tab

Reset All

ICDD

INTERNATIONAL CENTER FOR DIFFRACTION DATA

ISO 9001:2015

QUALITY MANAGEMENT SYSTEM CERTIFIED

BY DEKRA

CEP 100

110409 01

Search Window

References

Search

Subfile

- Custom PDF Set
- Alkaloid
- Amino Acid, Peptide & Complex
- Battery Material
- Bioactive
 - No Subclass
 - Depressant
 - Narcotic
 - Pesticide & Antimicrobial

Environment

- ☐ Ambient
- ☐ Non-ambient
 - ☐ Temp.
 - ☐ Press.
 - ☐ Temp. & press.
- ☐ Atomic coordinates
- ☐ Raw diffraction data

Periodic Table

Formula/Name

Classifications

Crystallography

Modulated

Diffraction

Physical Properties

Reference

Comments

Search all re

Author

Title

Publication

Journal/Patent

Volume

Year

Start Year

End Year

DOI

Range Input

Global Operator

Refine your search by selecting filters based upon the journal references of a material.

Select filters by **DOI**, **Title** (article title), **Author** (author name), **Journal/Patent**, **Coden** (journal coden), **Volume**, and **Year** (publication year).

- Journal/Patent
- CODEN
- Contains Fragments
- Contains Phrase
- Exactly
- Not

Search Window

Comments

Search

Subfile

- Custom PDF Set
 - Alkaloid
 - Amino Acid, Peptide & Complex
 - Battery Material
 - Bioactive
 - No Subclass
 - Depressant
 - Narcotic
 - Pesticide & Antimicrobial

Environment

- ☐ Ambient
- ☐ Non-ambient
 - ☐ Temp.
 - ☐ Press.
 - ☐ Temp. & press.
- ☐ Atomic coordinates
- ☐ Raw diffraction data

Status

- ☒ Primary
- ☒ Alternate
- ☐ Deleted

Quality Mark

- ☒ Star
- ☒ Good
- ☒ Indexed
- ☒ Calculated
- ☒ Prototyping
- ☒ Minimal Acceptable
- ☒ Blank
- ☒ Low-Precision
- ☐ Hypothetical

Database

- ☐ ICDD (00)
- ☐ ICSD (01)
- ☐ CSD (02)
- ☐ NIST (03)
- ☐ LPF (04)
- ☐ ICDD Crystal Data (05)

Periodic Table

Formula/Name

Classifications

Crystallography

Modulated

Diffraction

Physical Properties

Reference

Comments

Database Comments

Filter based on the text contained in comments.

Absolute Configuration:
Additional Diffraction Lines:
Additional Patterns:
Analysis:
ANX:
Atomic Position:
Bioactivity:
Boiling Point:

Search Reset Tab Reset All

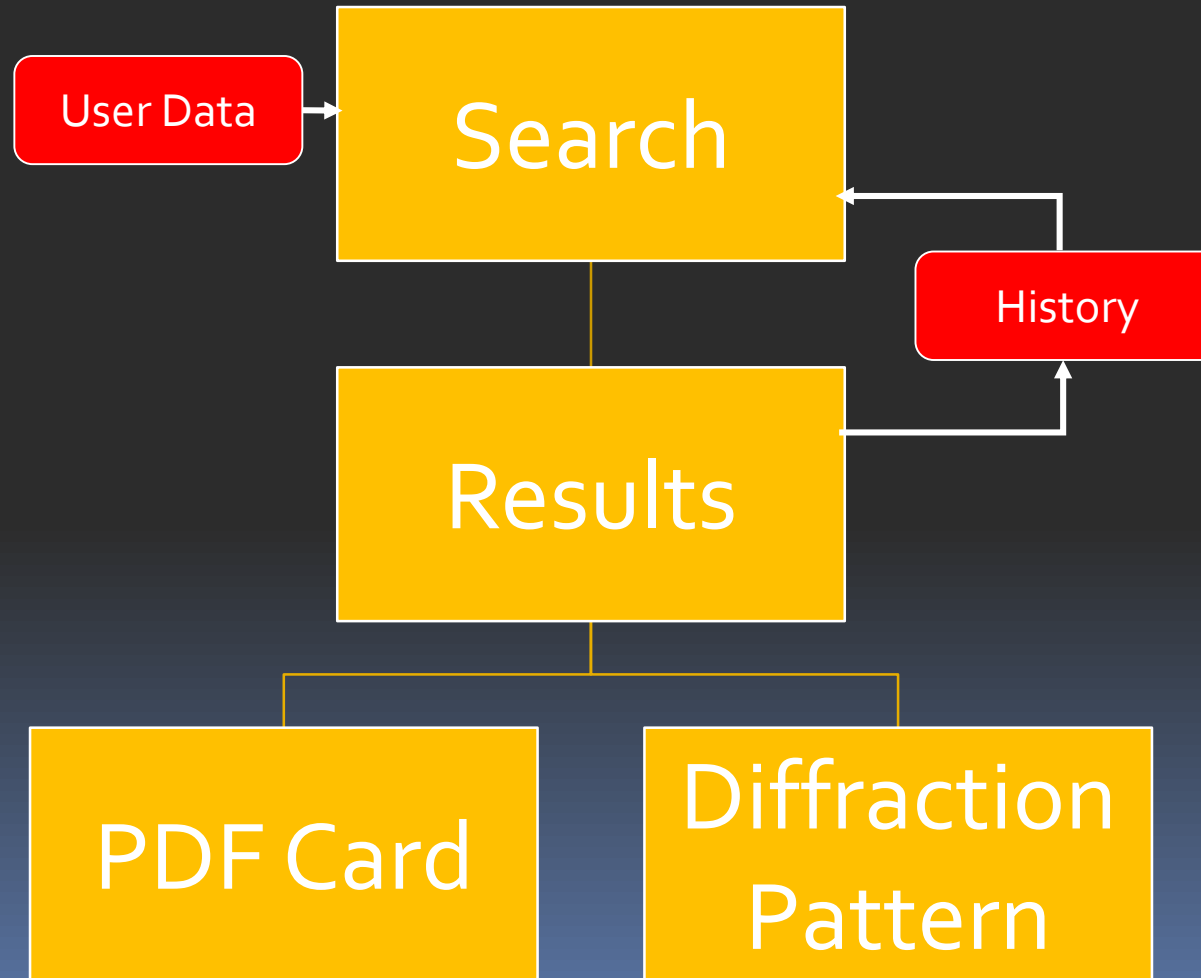
Range Input

Global Operator

DATA MINING BASICS

- Select your filter criteria
- Make use of logical Boolean operators, text and list boxes
- Search
- Review results
- Refine search with additional criteria

Note: Selected search criteria is highlighted in red to keep track of your selections.



Select
Elements in
Periodic Table

Search Example

The image displays three screenshots of the ICDD search interface, illustrating the steps to perform a search:

- Top Screenshot:** Shows the 'Search' window with the 'Periodic Table' tab selected. A red arrow points to the 'H' (Hydrogen) and 'Mg' (Magnesium) elements in the periodic table.
- Bottom Left Screenshot:** Shows the 'Search' window with the 'Crystallography' tab selected. A red circle highlights the 'Space Group' dropdown menu, which is set to 'P4/mmm'. A red arrow points to the 'P4/mmm' option.
- Bottom Right Screenshot:** Shows the 'Search' window with the 'Formula/Name' tab selected. A red circle highlights the 'Name' dropdown menu, which is set to 'Potassium Platinum Chloride'. A red arrow points to the 'Potassium Platinum Chloride' option.

Additional annotations include:

- A red box labeled 'Selected filters highlighted in red' pointing to the 'P4/mmm' and 'Potassium Platinum Chloride' selections.
- A red box labeled 'Select Space Group' pointing to the 'Space Group' dropdown menu.
- A red box labeled 'Select Compound Name' pointing to the 'Name' dropdown menu.

The bottom screenshot also shows the search criteria summary at the bottom:

Range Input: $[[Pt\ and\ Cl]]$ and $[Any\ Name\ contains\ fragments\ 'Potassium'\ And\ 'Platinum'\ And\ 'Chloride']$ and $[Space\ Group\ Symbol\ contains\ phrase\ 'P4/mmm']$ and $[Exclude\ deleted/hypothetical\ patterns]$

Search Results

Choose fields to be displayed in results

Results - 9 of 480,309

File Fields Tools

Open PDF Card Simulated Profile

My Defaults

Search Results

PDF #	QM	Chemical Formula	Compound Name	D1 (Å)	D2 (Å)	D3 (Å)	SYS
00-009-0367	I	K ₂ Pt Cl ₄	Potassium Platinum Chloride	6.940	3.160	3.550	T
01-073-1506	I	K ₂ (Pt Cl ₄)	Potassium Platinum Chloride	6.990000	3.169250	3.555730	T
04-006-6128	P	K ₂ Pt Cl ₄	Potassium Platinum Chloride	7.024000	3.183270	3.571050	T
04-007-2797	S	K ₂ Pt Cl ₄	Potassium Platinum Chloride	7.023000	3.183810	3.571940	T
04-007-5356	I	K ₂ Pt Cl ₄	Potassium Platinum Chloride	7.025000	3.182100	3.569270	T
04-007-7303	S	K ₂ Pt Cl ₄	Potassium Platinum Chloride	6.996100	3.159080	3.540590	T
04-007-7304	S	K ₂ Pt Cl ₄	Potassium Platinum Chloride	6.981300	3.156210	3.538480	T
04-009-8290	B	K ₂ Pt Cl ₄	Potassium Platinum Chloride	7.024000	3.183270	3.571050	T
04-013-8855	B	K ₂ Pt (CN) ₄ Cl _{0.32} (H ₂ O) _{2.6}	Potassium Platinum Chloride Cyanide Hydrate	9.866000	4.412210	6.976320	T

[(Pt and Cl)] and [Any Name contains fragments 'Potassium' And 'Platinum' And 'Chloride'] and [Space Group Symbol contains phrase 'P4/mmm'] and [Exclude deleted/hypothetical patterns]

Search Filters

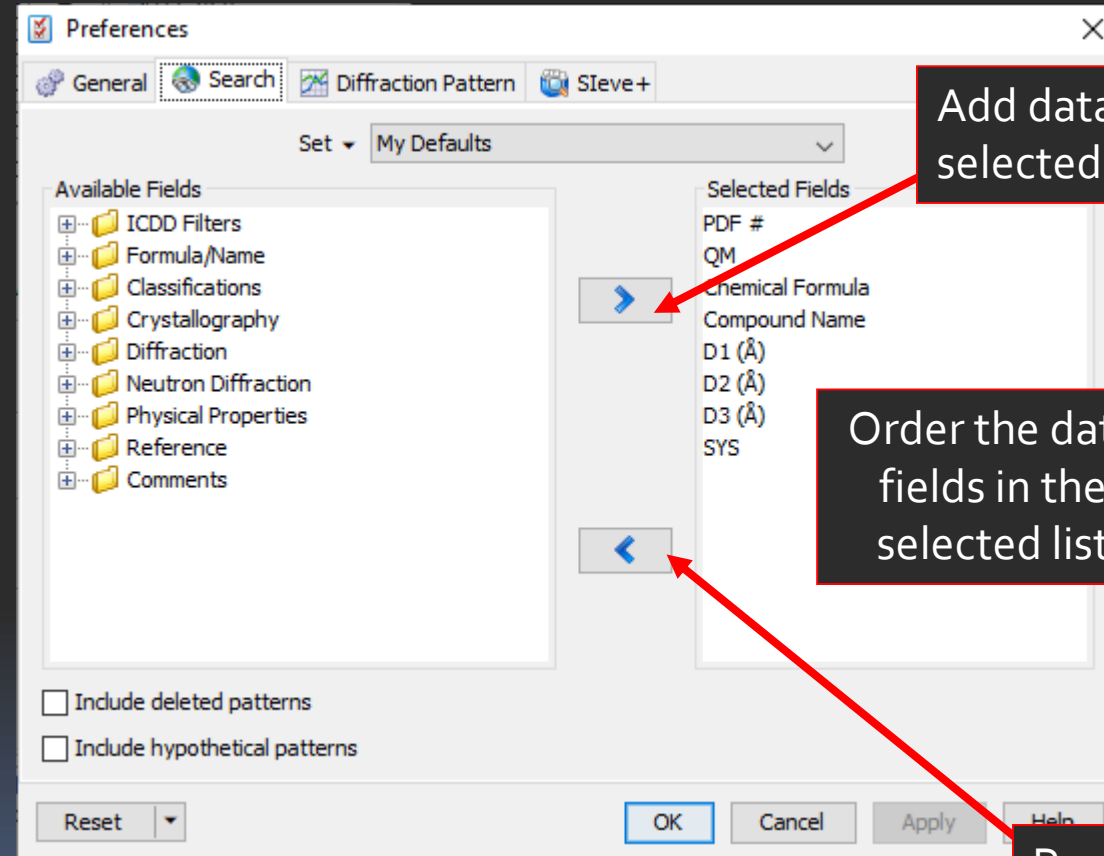
Double-click on a PDF number to view the entire PDF Card



Preferences Module

Open the Preferences Module to select which data fields you would like to display in your results.

You can also select the order in which the data fields are displayed.



Add data fields to selected list

Order the data fields in the selected list

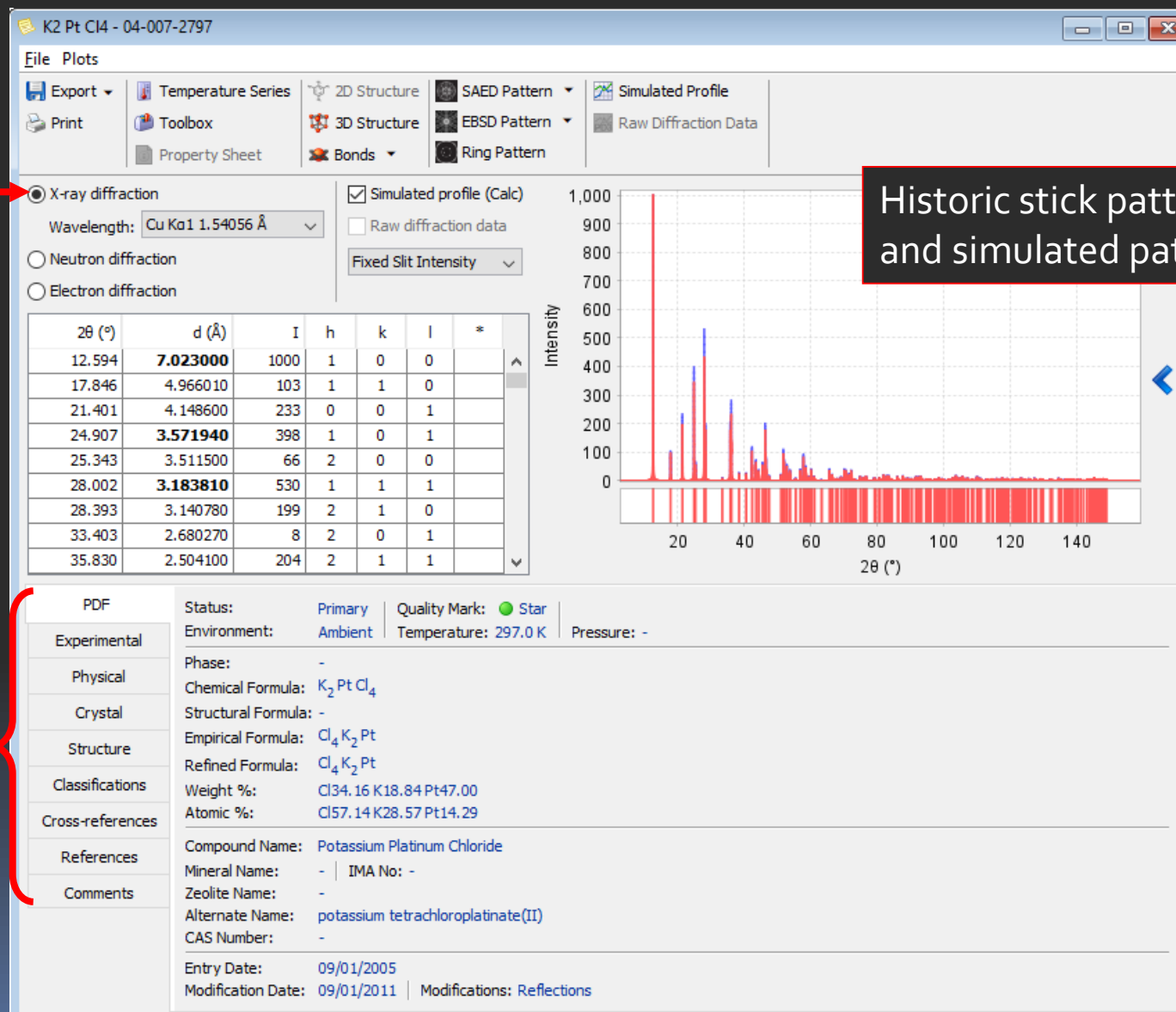
Remove data fields from the selected list

PDF Data Card

Choose equipment factors

Historic stick pattern and simulated pattern

Tabular view of reported data



PDF Data Card

Hold the Ctrl key, then select PDF cards. Right click mouse, select Open PDF Card.

Open multiple PDF Cards.

results - 9 of 480,309

Fields Tools

Open PDF Card My Defaults

PDF #	QM	Chemical Formula	Compound Name	D1 (Å)	D2 (Å)
009-0367	I	K_2PtCl_4	Potassium		
073-1506	I	$K_2(PtCl_4)$	Potassium		
006-6128	P	K_2PtCl_4	Potassium		
007-2797	S	K_2PtCl_4	Potassium		
007-5356	I	K_2PtCl_4	Potassium		
007-7303	S	K_2PtCl_4	Potassium		
007-7304	S	K_2PtCl_4	Potassium		
009-8290	B	K_2PtCl_4	Potassium		
013-8855	B	$K_2Pt(CN)_4Cl_{0.32}(H_2O)_{2.6}$	Potassium Hydrate		

Open PDF Card

Tools/Simulations

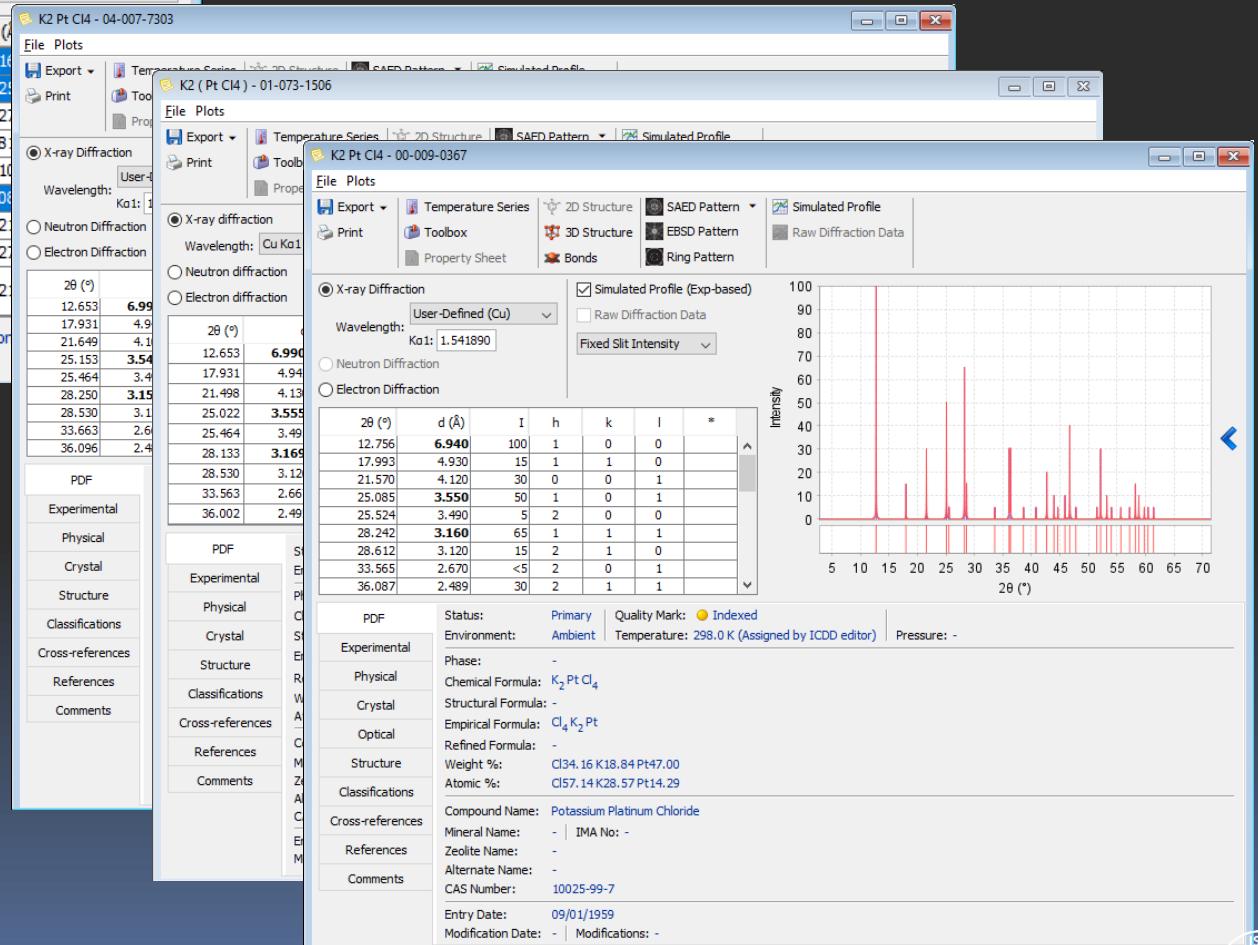
Add to Custom PDF Set...

Remove from Custom PDF Set...

Copy Compound Name

Remove Rows

[(Pt and Cl)] and [Any Name contains fragments 'Potassium' And 'Platinum' And 'Chloride'] and [Space Group Symbol contains 'P4/mmm'] and [Exclude deleted/hypothetical patterns]



PDF Data Card Features



View Temperature Series

Results - 9 of 460,954

File Fields Tools

Open PDF Card Simulated Profile

Temp (K)	Pressure (GPa)	PDF #	QM	Chemical Formula	Compound Name	RedCell Vol (Å ³)	Author - PR	Journal - PR	Year - PR	Dcalc (g/cm ³)	Dstruc (g/cm ³)
120.0		04-007-7303	S	K ₂ PtCl ₄	Potassium Platinum Chloride	200.93	Takazawa H., Ohba S., Saito Y., Sano M.	Acta Crystallogr., Sect. B: Struct. Sci.	1997	3.43	3.43
120.0		04-007-7304	S	K ₂ PtCl ₄	Potassium Platinum Chloride	200.06	Takazawa H., Ohba S., Saito Y., Sano M.	Acta Crystallogr., Sect. B: Struct. Sci.	1997	3.445	3.44
293.0	1.01E-4	04-007-5356	I	K ₂ PtCl ₄	Potassium Platinum Chloride	204.51	Maier R.H.B., Ovston P.G., Wood A.M.	Acta Crystallogr., Sect. B: Struct. Crystallogr., Cryst. Chem.	1972	3.37	3.37
297.0		04-007-2797	S	K ₂ PtCl ₄	Potassium Platinum Chloride	204.62	Ohba S., Sato S., Saito Y., Ohshima K., Harada J.	Acta Crystallogr., Sect. A: Found. Crystallogr.	1985	3.369	3.37
297.0		04-009-8290	B	K ₂ PtCl ₄	Potassium Platinum Chloride	204.60	Ohba S., Sato S., Saito Y., Ohshima K., Harada J.	Acta Crystallogr., Sect. B: Struct. Sci.	1983	3.369	3.37
298.0		00-001-0102	I	K ₂ PtCl ₄	Potassium Platinum Chloride	201.79	Hanawalt, J., et al.	Anal. Chem.	1938	3.415	
298.0		00-009-0367	I	K ₂ PtCl ₄	Potassium Platinum Chloride	201.96	Staritzky, A.	Anal. Chem.	1956	3.413	
298.0		01-073-1506	I	K ₂ (PtCl ₄)	Potassium Platinum Chloride	201.79	Dickinson, R.G.	J. Am. Chem. Soc.	1922	3.416	3.415
298.0		04-006-6128	P	K ₂ PtCl ₄	Potassium Platinum Chloride	204.60	Ohba S., Matsuda T., Hattai I., Harada J.	J. Phys. Soc. Jpn.	1981	3.369	3.37

Temperature Series (K2 Pt Cl4 - 04-007-2797)

View Toolbox

Toolbox

Settings

Wavelength: User-Defined (Cu) Ka1: 1.541890

a (Å): 7.023 a (°): 90

b (Å): 7.023 b (°): 90

c (Å): 4.1486 c (°): 90

Calculate Peak

h: ☐ i: ☐ 2θ: ☐

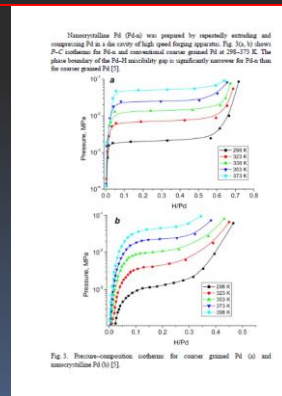
h₂ ☐ k₂ ☐ d-spacing: ☐

Calculate Peak List

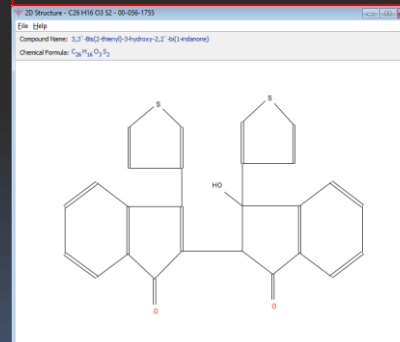
Start 2θ (°):

Stop 2θ (°):

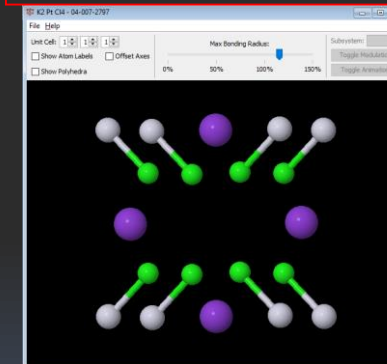
View Property Sheet



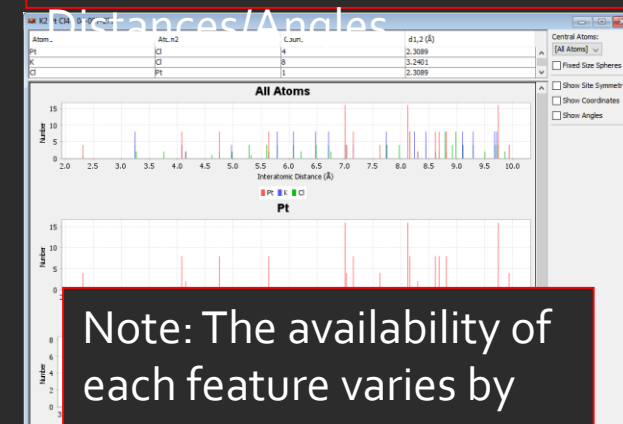
View 2D Structure



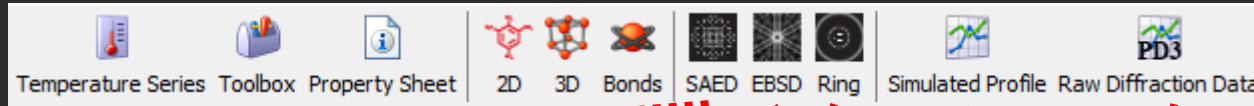
View 3D Structure



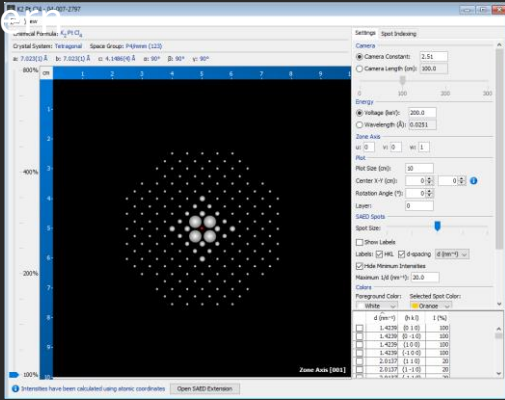
View Bond



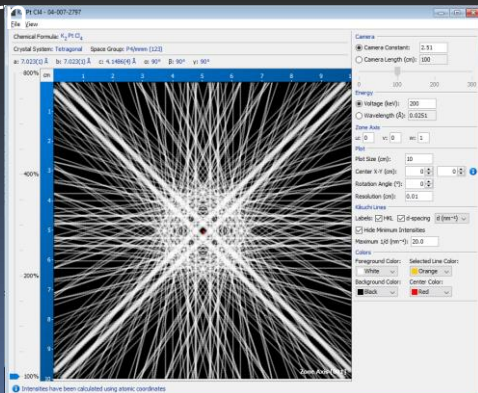
PDF Data Card Features



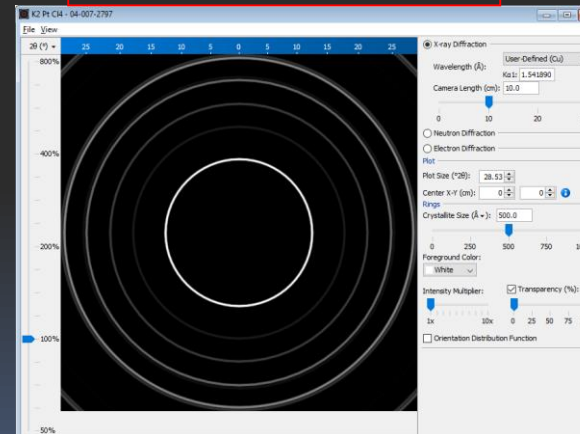
View Simulated Electron Spot Pattern



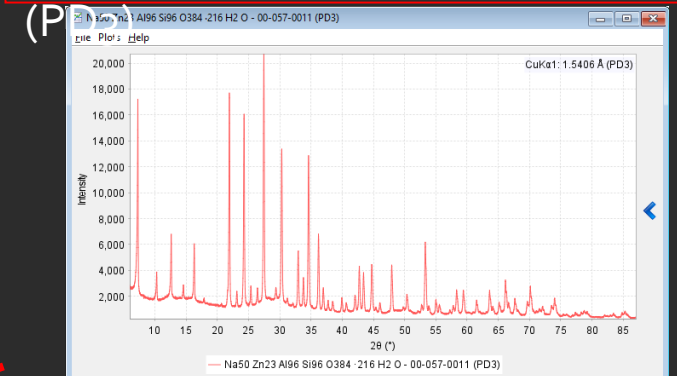
View Electron Backscattering Pattern



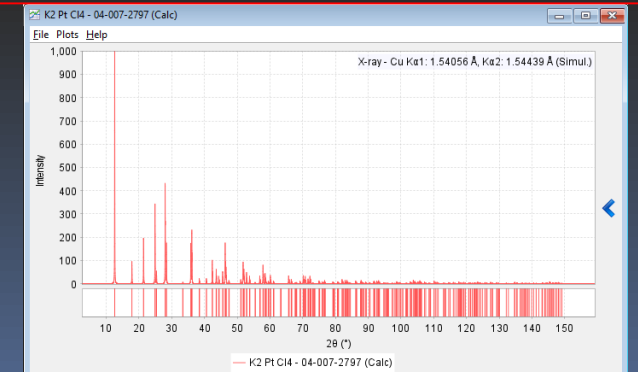
View Ring Pattern



View Raw Diffraction Data



View Simulated Diffraction Profile





Thank you for viewing our tutorial.
Additional tutorials are available at the ICDD® website.
www.icdd.com

International Centre for Diffraction Data®
12 Campus Boulevard
Newtown Square, PA 19073
Phone: 610.325.9814
Toll Free Number in US & Canada: 866.378.0331
Fax: 610.325.9823