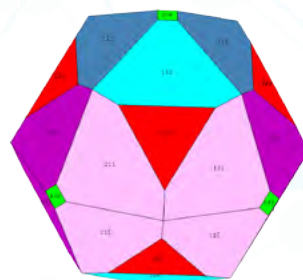
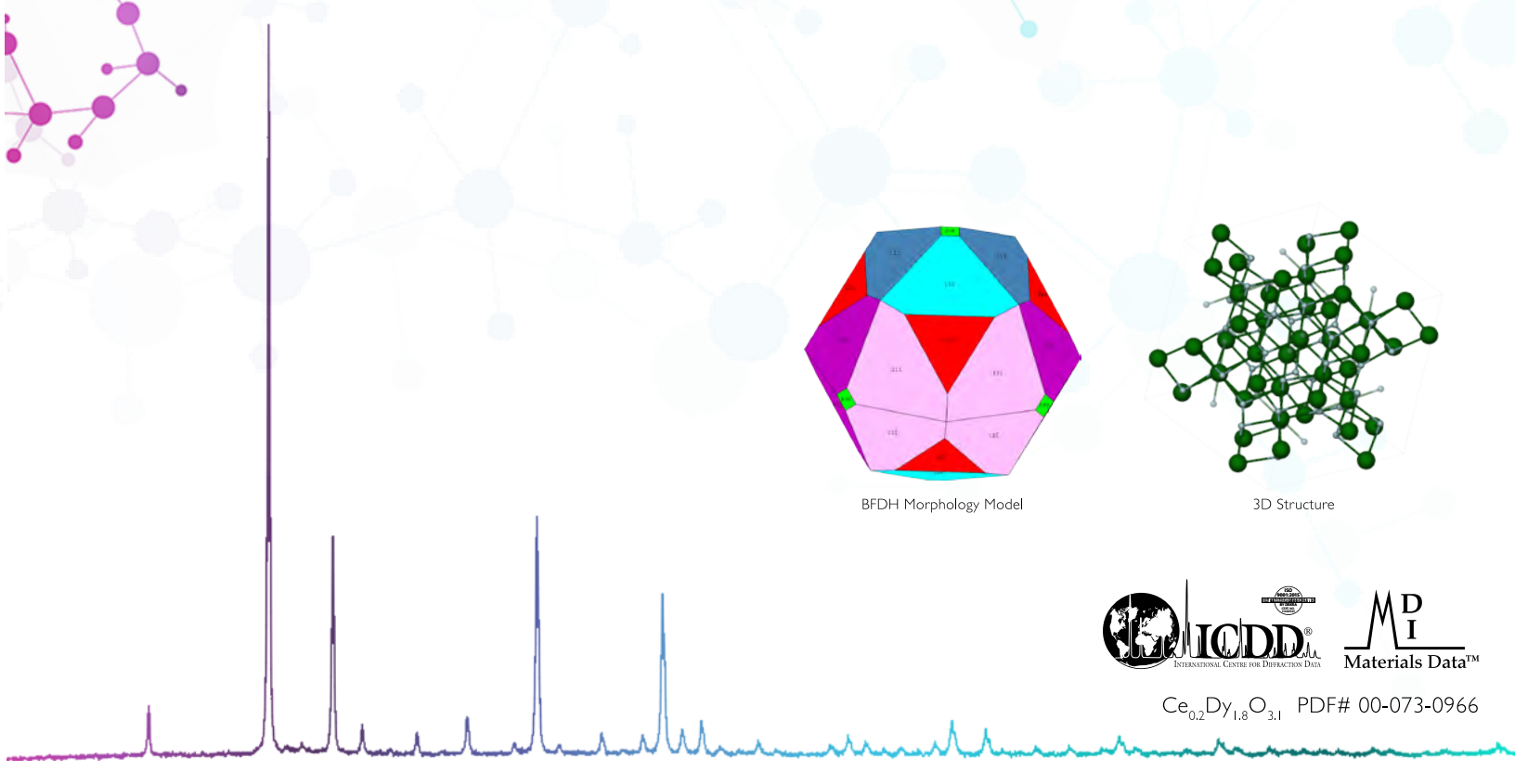


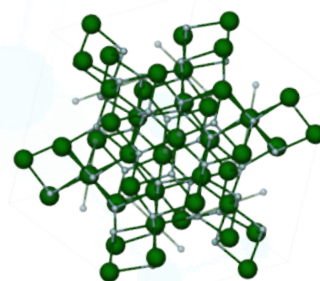
2023 - 2024

# SALES CATALOG

The Powder Diffraction File™ (PDF®) & JADE® Software



BFDH Morphology Model



3D Structure



ICDD®  
International Centre for Diffraction Data



Materials Data™

# Our collaborative partners include:

**Cambridge Crystallographic Data Centre (CCDC)** Cambridge, UK - Cambridge Structural Database (CSD)

**FIZ Karlsruhe – Leibniz Institute for Information Infrastructure (FIZ)** Karlsruhe, Germany - Inorganic Crystal Structure Database (ICSD)

**National Institute of Standards and Technology (NIST)**  
Gaithersburg, Maryland, USA

**Material Phases Data System (MPDS)**  
Vitznau, Switzerland - Linus Pauling File (LPF)

## PDF® Databases - Why We Are The Best!

- More data, higher quality, more content, many types of solid-state reference data
- The world's largest solid-state collection of minerals, metals and alloys, polymers, active pharmaceuticals, and commercial materials
- The world's largest and most diverse (by formula) collection of inorganic structures
- The world's largest collection of modulated structures
- Extensive bibliographic collections - thousands of journals, hundreds of thousands of authors
- Standardized data, nomenclature, and structural classifications plus brand names, trade names, mineral names, zeolite names, and common names of commercial materials
- Identify materials accurately by utilizing the PDF's extensive subfile system that classifies materials by chemistry and application
- New data is contributed annually by highly qualified grantees from around the world
- PDF products are compatible with major diffraction vendor's software



Quality Management System Certified  
to ISO 9001:2015 by DEKRA

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■ Resources - Advances in X-ray Analysis, Powder Diffraction Journal	
■ Grant-in-Aid	

Ordering/Shipping Fast Facts .....

## ONLINE RESOURCES

Visit [www.icdd.com](http://www.icdd.com). Learn from reference articles, technical bulletins, tutorials, and instructional videos. Some tutorials and webinars focus on the capabilities of the PDF database, while others illustrate methods used to analyze pharmaceuticals, polymers, and minerals. It is free to search and browse documents from ICDD's Pharmaceutical Powder X-ray Diffraction Symposium (PPXRD) and the ICDD Spring Meetings. You get open access to over 1,000 full publications from Advances in X-ray Analysis (AXA) - the proceedings of the Denver X-ray Conference (DXC). Try the Powder Diffraction File (PDF) Search and search using chemical name, formula, and elements to suggest which ICDD database product is right for you.



Introducing the 2024 Powder Diffraction File™

*The Best Just Got Better!*



# PDF-5+

## The Next-Level Database

PDF-5+ is the world's most comprehensive Powder Diffraction File™ (PDF®) database with 1,061,800+ entries!

PDF-5+ combines the ICDD's PDF-4+ and PDF-4/Organics databases. PDF-5+ contains 442,600+ inorganic and 623,000+ organic entries to ensure that you have the data you need for all of your phase identification needs. Every entry is editorially reviewed and assigned quality marks, so the curated PDF-5+ database allows users to do quantitative analysis by any of three methods: Rietveld Analysis, Reference Intensity Ratio (RIR) Method, or Whole Pattern Fitting.

## KEY POINTS

- Featuring 1,061,800+ Entries, including 586,700+ Entries with Atomic Coordinates, 623,000+ Organic Entries
- Combines Powder and Single Crystal Data
- Analyze X-ray, Synchrotron, Electron & Neutron Data
- Digitized Patterns
- Molecular Graphics



\*Also available on USB & DVD



Follow Us  
On Social Media

12 Campus Boulevard  
Newtown Square, PA 19073  
(610) 325-9814  
sales@icdd.com  
www.icdd.com

# WHAT'S NEW FOR 2023-2024



## Introducing Release 2024 of the Powder Diffraction File THE PRODUCT LINE INCLUDES:

PDF-5+

PDF-5+/Web

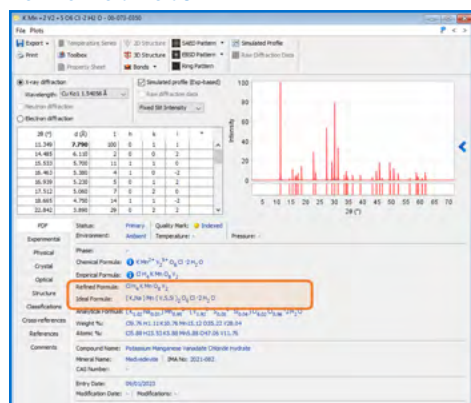
PDF-5+ Server Edition

PDF-4/Axiom

PDF-4/Minerals

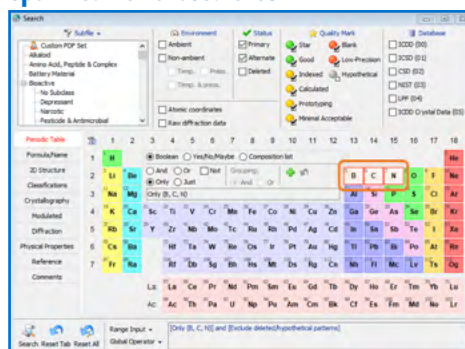
PDF-2

### New Formula Fields



- **Ideal Formula:** Describes the general chemistry of the compound, especially in cases of minerals and solid solutions. Minor substituents or variations may be ignored in this representation.
- **Analytical Formula:** Based on experimental elemental analysis, such as XRF and microprobe analysis. This formula is descriptive and represents a composition derived based on experimental measurements.

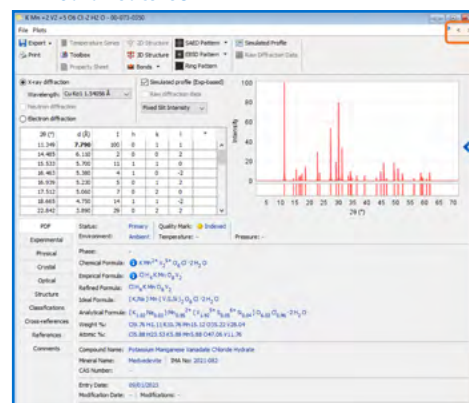
### Optimized Element Searches



- The "Only" and "Just" operators for the periodic table search have been optimized for faster results

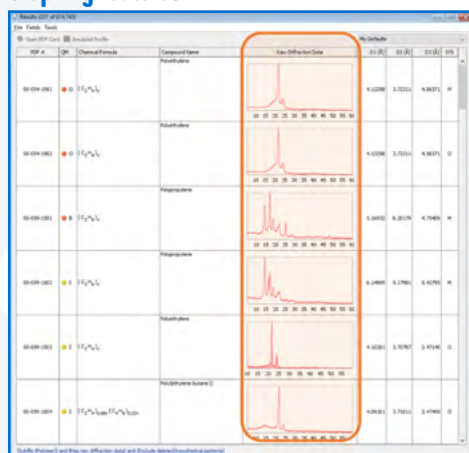
	2023	2024
<b>Only (B, C, N)</b>	2.6s	0.5s
<b>Just (H, C, N, P, O)</b>	45.5s	7.3s
<b>Just (Mg, B, Al, C, Si, N, O, F)</b>	2m 38s	1s

### PDF Card Features



- Arrow buttons to traverse through search results table
  - Mouse wheel option

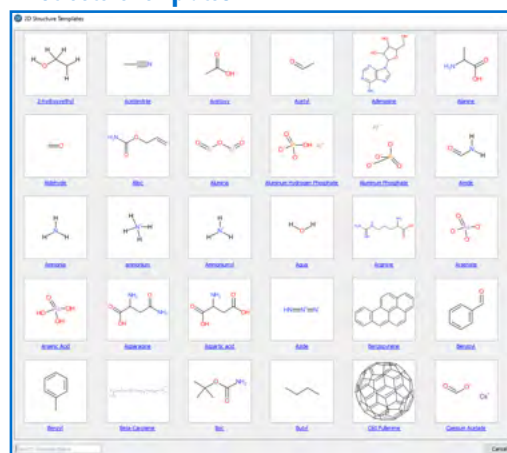
### Graphing Features



- Automatic vertical zooming
- Gradient color fill option
- Raw data (PD3 patterns) in search results
- Diffraction pattern preview when dragging and dropping

Area highlighted in orange not available in PDF-2 2024

### 2D Structure Templates\*



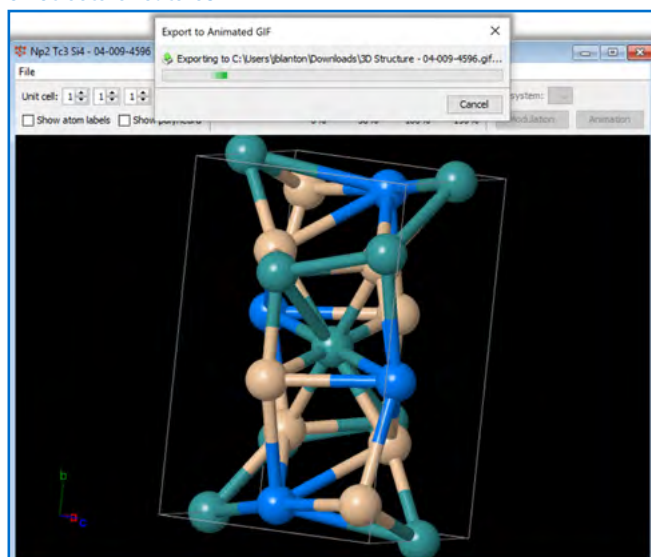
- Used for 2D structure and substructure searches
- 200 templates available
- Use as starting structure or complete structure
- Search by template name

\*Available only in PDF-5+ 2024

# WHAT'S NEW FOR 2023-2024

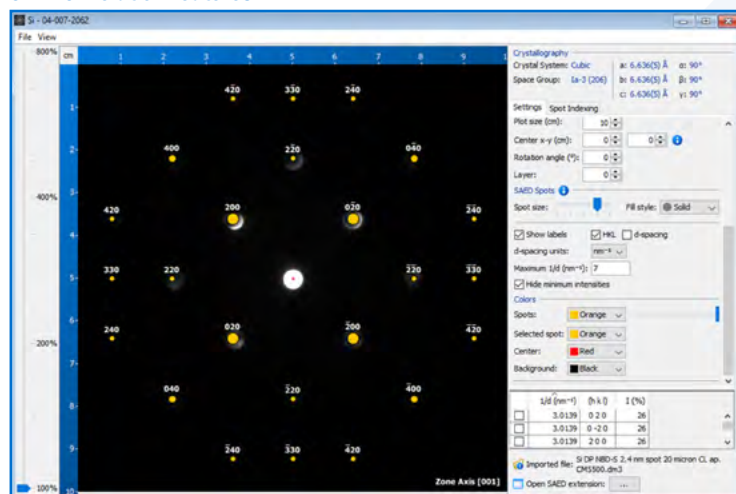


## 3D Structure Features\*



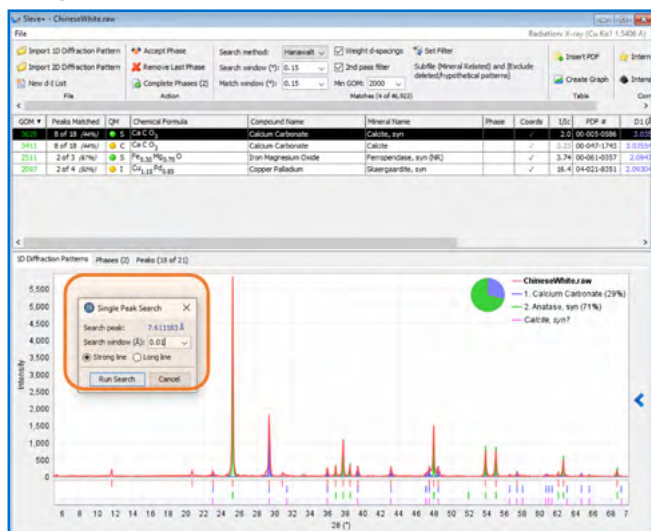
- Export 3D structure animation to a GIF file (Only available in PDF-4 and PDF-5+ databases)

## SAED Simulation Features\*



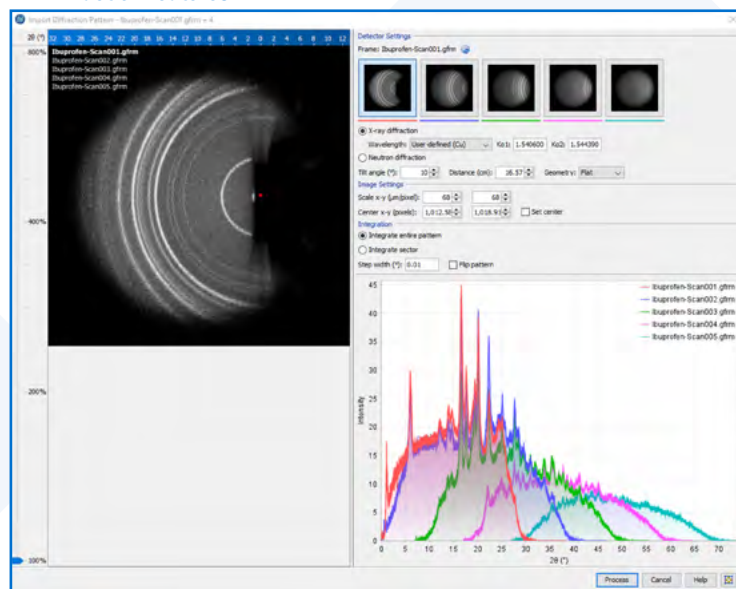
- Imported image overlay on SAED simulation of silicon
  - Added support for importing Gatan \*.dm3 files (Only available in PDF-4 and PDF-5+ databases)

## Sieve/Sieve+ Features



- Support for new file formats
- Hide irrelevant matches
- Supports NIST SRMs as internal standard
- Single peak search
  - Select peak using the mouse
  - Search strong or long lines
  - User-defined error window
  - Useful for trace phase analysis

## 2D Diffraction Features\*



- 2D images are dynamically displayed when importing multiple files
- Red vertical line indicates progress of pattern integration
- Thumbnail preview images

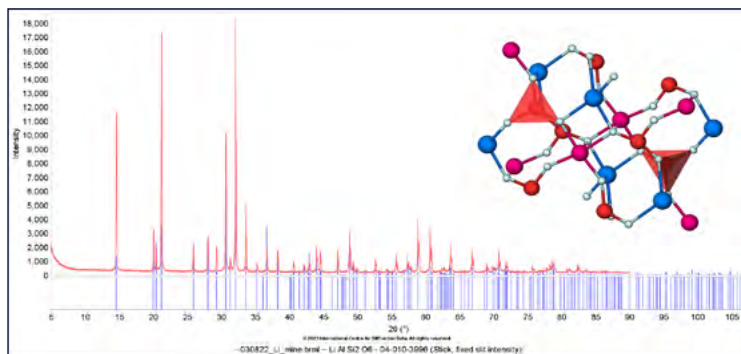
\*Only available in PDF-4 and PDF-5+ databases



# PDF-5+ 2024

## The Next-Level Database

PDF-5+ combines the world's largest sources of inorganic and organic diffraction data from crystals and powders into a single database.



Mining sample identified as spodumene,  $\text{LiAlSi}_2\text{O}_6$ , a source of lithium for Li-ion batteries.

## KEY POINTS

- Rapid phase identification designed to support automated quantitative analyses
- Features 1,061,800+ entries with over 586,700+ having atomic coordinates
  - 442,600+ entries for inorganic materials
  - 623,000+ entries for organic materials
- Integrated data mining software
- All entries have digital patterns for use in total pattern analysis
- More than 956,600+ entries have  $I/I_c$  values for quantitative analysis by Reference Intensity Ratio (RIR) method
- Combines powder and single crystal data
- Includes crystalline, semi-crystalline, and amorphous solid-state materials
- World's largest and most diverse collection of structures for inorganic and organic materials
- Extensive data mining is facilitated with 137 display fields coupled with 83 searches
- One (1) year license serviced by subscription

## PDF-5+ Purchase Options

PDF-5+ 2024	DVD CODE	USB CODE	DOWNLOAD CODE	2023-2024 List \$	2023-2024 Academic \$
New - Single License	P5D24	P5S24	P5L24	\$9,345	\$6,215
Renewal from 2023 to 2024	P5RD24	P5RS24	P5RL24	\$2,065	\$1,325
<b>PDF-5+ and JADE Pro Bundle*</b>					
New - Single License	BUJPP5D24	BUJPP5S24	BUJPP5L24	\$16,265	\$11,425
*Purchase a new license for PDF-5+ and JADE Pro					
<b>PDF-5+ 2024 Multi-year License*</b>					
Renewal - 3 year License	P5D25MR27	P5S25MR27	P5L25MR27	\$5,575	\$3,580
Renewal - 5 year License	P5D25MR29	P5S25MR29	P5L25MR29	\$8,775	\$5,630
<b>PDF-5+ Scholar 2024 (10-Year License Package)*</b>					
PDF-5+ New - Single License	P5D24	P5S24	P5L24		\$6,215
Scholar Multi-year	P5SPD25MR29	P5SPS25MR29	P5SPL25MR29	NA	\$5,630
					\$11,845

## Save Money! Take advantage of ICDD's Site License - Request a quote today!

PDF-5+ 2024 Site License*	DVD CODE	USB CODE	DOWNLOAD CODE	2023-2024 List \$	2023-2024 Academic \$
New - Master License	P5D24M	P5S24M	P5L24M	\$9,345	\$6,215
New - additional Licenses, each	P5D24C	P5S24C	P5L24C	\$2,065	\$1,325
Renewal - Yearly Master License	P5RD24M	P5RS24M	P5RL24M	\$2,065	\$1,325
Renewal - additional Licenses, each	P5RD24C	P5RS24C	P5RL24C	\$805	\$540
<b>PDF-5+ 2024 Site/Multi-year License*</b>					
Renewal - 3 year Master Site License	P5D25MR27M	P5S25MR27M	P5L25MR27M	\$5,575	\$3,580
Renewal - 3 year additional Licenses, each	P5D25MR27C	P5S25MR27C	P5L25MR27C	\$2,415	\$1,620
Renewal - 5 year Master Site License	P5D25MR29M	P5S25MR29M	P5L25MR29M	\$8,775	\$5,630
Renewal - 5 year additional Licenses, each	P5D25MR29C	P5S25MR29C	P5L25MR29C	\$4,025	\$2,700
<b>PDF-2 to PDF-5+ Conversion</b>					
PDF-2 2023 to PDF-5+ 2024	P2523RDU24	P2523RSU24	P2523RLU24	\$2,065	\$1,325
PDF-2 2022 to PDF-5+ 2024	P2522RDU24	P2522RSU24	P2522RLU24	\$4,130	\$2,650
PDF-2 2021 to PDF-5+ 2024	P2521RDU24	P2521RSU24	P2521RLU24	\$6,195	\$3,975
PDF-2 2020 to PDF-5+ 2024	P2520RDU24	P2520RSU24	P2520RLU24	\$8,260	\$5,300

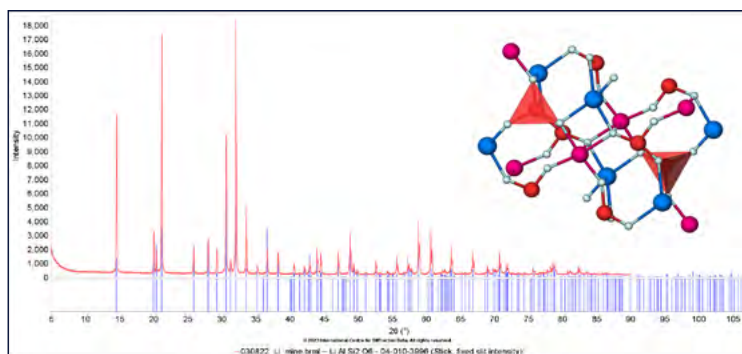
\*Please see product policies on pages 18 and 19



# PDF-5+/WEB 2024

## Data on the Go

PDF-5+/Web provides portability to the PDF-5+ database via the internet. It enables access to the entire suite of programs and data files, so that it is equivalent to PDF-5+ 2024.



Mining sample identified as spodumene,  $\text{LiAlSi}_2\text{O}_6$ , a source of lithium for Li-ion batteries.

## KEY POINTS

- PDF-5+ database via the Internet
- Access to the entire suite of PDF-5+ programs and data files
- Can be used on any computer that meets the specifications
- Requires access to a high-speed internet connection
- Delivered as a USB compatible dongle\*
- Installation and renewals are handled via the internet
- One (1) year license serviced by subscription



## SYSTEM REQUIREMENTS

- PDF-5+/Web 2024 requires a fully-powered USB port, web browser, and ability to open TCP/IP ports through any existing firewalls. Connectivity speed should be at least 10 Mbps or higher.\*

\*see Preferred Computer Specifications, page 16



## SUPPORTED BROWSERS



Edge



Chrome



Firefox

## PDF-5+/Web Purchase Options

PDF-5+/Web 2024	Dongle Code	2023-2024 List \$	2023-2024 Academic \$
New - Single License	W524	\$9,345	\$6,215
Renewal from 2023 to 2024	W5R24	\$2,065	\$1,325
<b>PDF-5+/Web 2024 Multi-year License*</b>			
Renewal - 3 year license	W525MR27	\$5,575	\$3,580
Renewal - 5 year license	W525MR29	\$8,775	\$5,630
<b>PDF-5+/Web 2024 Site License*</b>			
New - Master License	W524M	\$9,345	\$6,215
New - additional licenses, each	W524C	\$2,065	\$1,325
Renewal - Yearly Master License	W5R24M	\$2,065	\$1,325
Renewal - additional licenses, each	W5R24C	\$805	\$540

**Save Money! Take advantage of ICDD's Site License - Request a quote today!**

PDF-5+/Web 2024 Site/Multi-year License*	Dongle Code	2023-2024 List \$	2023-2024 Academic \$
Renewal - 3 year Master Site License	W525MR27M	\$5,575	\$3,580
Renewal - 3 year additional licenses, each	W525MR27C	\$2,415	\$1,620
Renewal - 5 year Master Site License	W525MR29M	\$8,775	\$5,630
Renewal - 5 year additional licenses, each	W525MR29C	\$4,025	\$2,700
<b>PDF-5+/Web Conversion</b>			
PDF-2 2023 to PDF-5+/Web 2024	W2W23RU24	\$2,065	\$1,325
PDF-2 2022 to PDF-5+/Web 2024	W2W22RU24	\$4,130	\$2,650
PDF-2 2021 to PDF-5+/Web 2024	W2W21RU24	\$6,195	\$3,975
PDF-2 2020 to PDF-5+/Web 2024	W2W20RU24	\$8,260	\$5,300
PDF-4+ 2023 to PDF-5+/Web 2024	W4W23RU24	\$2,065	\$1,325

\*Please see product policies on pages 18 and 19

# The Network Shareable PDF<sup>®</sup> is Here!



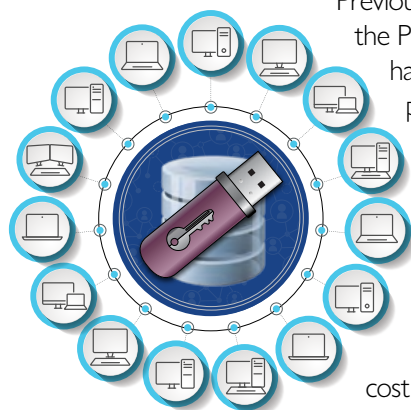
**PDF-5+ SERVER EDITION**

**DATABASE**

## Extend the Power of Your Database Built for Teams of Ten or More

Workplaces and work habits have evolved from just a few years ago, and this new database licensing model provides the flexibility that large organizations and academics need to meet the varying demands of clients, teams, and students.

Previously, our ICDD databases have all been tied to a single PC. But now, for the first time, the PDF-5+ can float between users. We've taken the floating seat license model that has proven so popular from JADE Pro and applied it to our most powerful database product, PDF-5+.



Install on your server and as many computers as you wish. A 10-User license provides access to 10 computers at a time and floats among an unlimited number of systems. Deployment to new hires is seamless. When it's time for the latest database, your renewal is simplified with one single product. Ensure everyone in your organization is using the latest set of data with one shared floating 10 or more seat license. Additional benefits occur when access is granted to occasional use individuals without any added cost to your bottom line.

Your IT department will be happy as updates are streamlined, all while offering savings for your budget. If you need to provide access to 10 or more systems, please contact us at [sales@icdd.com](mailto:sales@icdd.com) to consider how our new Server License would work best for your team.



## PDF-5+ 2024 The Next-level Database

PDF-5+ combines the world's largest sources of inorganic and organic diffraction data from crystals and powders into a single database.

PDF-5+ combines the ICDD's PDF-4+ and PDF-4/Organics databases. PDF-5+ contains 442,600+ inorganic and 623,000+ organic entries to ensure that you have the data you need for all of your phase identification needs. Every entry is editorially reviewed and assigned quality marks, so the curated PDF-5+ database allows users to do quantitative analysis by any of three methods: Rietveld Analysis, Reference Intensity Ratio (RIR) method, or Whole Pattern Fitting.



# Include JADE Pro Analysis Software on your Server Edition



## PDF-5+ SERVER EDITION WITH JADE PRO



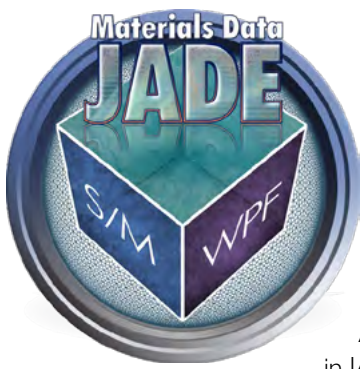
## JADE Pro The Analysis Software Professionals Choose

You need data you can trust, AND you need to find the best way possible to analyze your data. Now you can extend the power of your ICDD PDF-5+ Server Edition by including the highly regarded data analysis software JADE Pro. We created JADE to provide independent, unbiased results for peak search, whole pattern fitting, and Rietveld. JADE gets daily improvements and has grown to include an enormous list of valuable tools for your materials research and exploration. The power of JADE combined with the PDF-5+ database in a server license means a team can easily share a 10-seat license. The Server Edition can result in cost savings for your organization and a chance for you to extend the power to your team by providing access to BOTH the PDF database and JADE to as many individuals as you want. The database and software products offer the same functionality as the individual products. In coupling them in a 10 or more user server license, important resources are available to more team members, and everyone is in sync, all while reducing costs.

### KEY POINTS

- All-inclusive - Everything in JADE Standard and so much more
- Phase ID (Search/Match)
- Batch processing Whole Pattern Fitting (WPF) and Rietveld
- One-Click-Analysis™ for Whole Pattern Fitting (WPF)
- Pattern Indexing (All Crystal Systems)
- Rietveld Structure Refinement (Atomic Parameters)
- Ab Initio Tools (Charge Flipping +)
- Cluster Analysis of Powder Patterns
- Hardware Independent - supports a wide range of diffractometers
- Floating Network License - can work as a shareable multi-seat license
- Discounted Additional Seats Available





# JADE Pro

JADE Pro is all-inclusive!

JADE Pro includes all of the features of JADE Standard, plus batch processing Whole Pattern Fitting (WPF) and Rietveld refinement tools that go beyond what is available in JADE Standard. JADE's One-Click-Analysis™ and the JADE Toolkit are only found in JADE Pro. Additionally, JADE Pro features a unique floating network license that allows access on one concurrent system at a time, so when a license is not in use, it is available to someone else in your organization. Discounted additional seats create access to more concurrent shareable licenses that work together.

## KEY POINTS

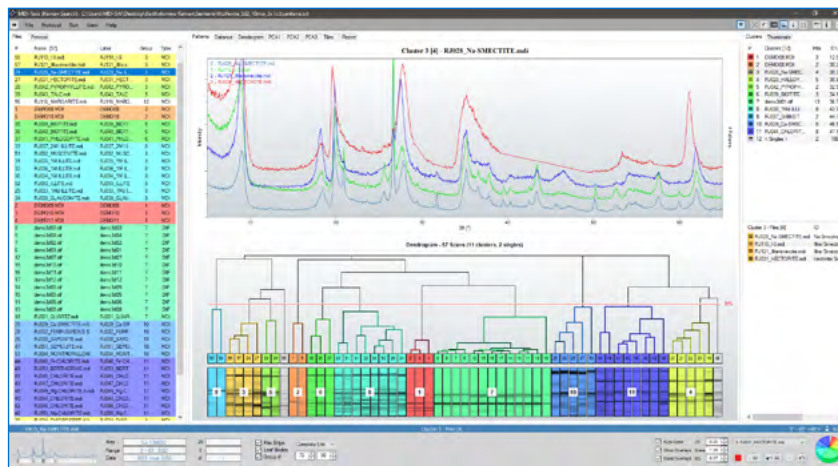
- All-inclusive - Everything in JADE Standard and so much more
- Phase ID (Search/Match)
- Batch processing Whole Pattern Fitting (WPF) and Rietveld
- One-Click-Analysis™ for Whole Pattern Fitting (WPF)
- Pattern Indexing (All Crystal Systems)
- Rietveld Structure Refinement (Atomic Parameters)
- Ab Initio Tools (Charge Flipping +)
- Cluster Analysis of Powder Patterns
- Hardware Independent - supports a wide range of diffractometers
- Floating Network License - can work as a shareable multi-seat license
- Discounted Additional Seats Available



## 3 NEW TOOLKIT FEATURES

Toolkit is found only in JADE Pro

Toolkit has expanded its feature set!

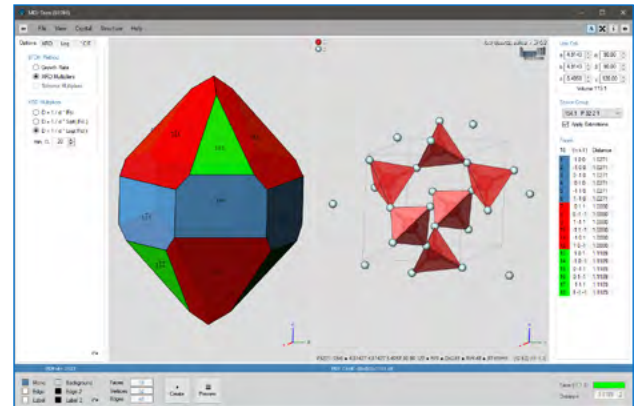


### Dendrogram▲

View your clusters with automatic cluster color coding. You can now streamline your analysis by adding reference patterns as cluster markers, recalling setup protocols for reproducibility and other correlation functions for determining pattern similarities.

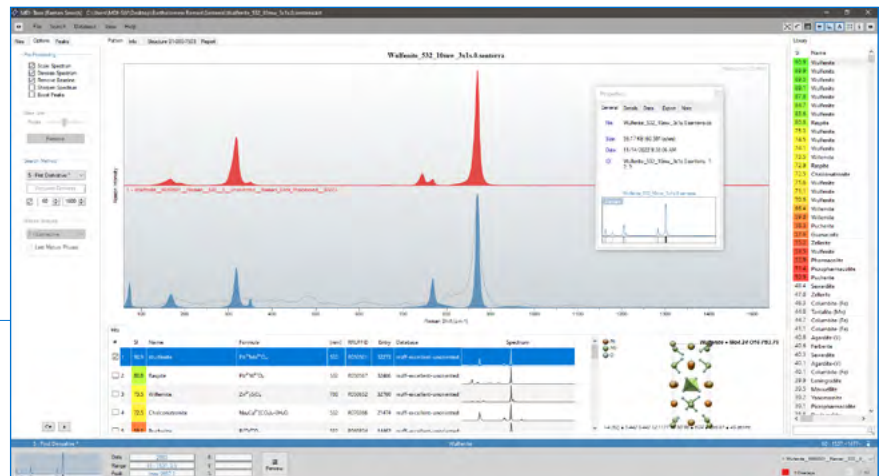
### RAMAN Mineral▶

Designed for the mineral phase ID from Raman Stokes spectra. Whole spectra correlation functions are used for finding similarity matches for single-phase and multi-phase spectra.



### BFDH Morphology▲

Create predicted crystal shapes based on the Bravais-Friedel-Donnay-Harker model. Other options include ability to promote the presence of certain (hkl)-faces by applying XRD multipliers from calculated structure intensities or calculating a Scherrer shape from fitted profiles.





# ADDITIONAL TOOLKIT FEATURES

Toolkit is found only in JADE Pro

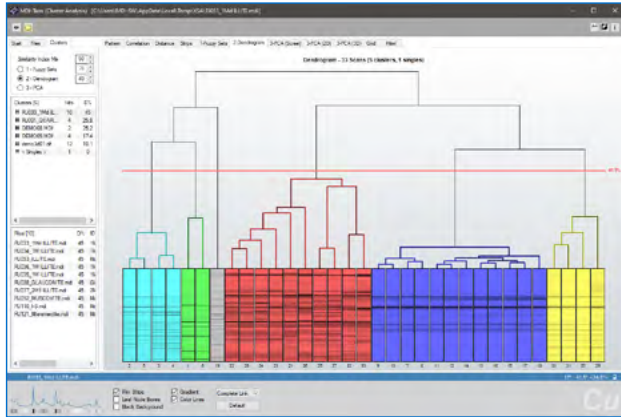
Toolkit also includes these utilities designed for JADE.

## For Oriented Clays - ClaySim ▶

For (00l)-patterns. Performs simulations and analyses of oriented clays based on structure types introduced by R.C. Reynolds.

## XRD Digitizer

Take a picture of an XRD plot and this tool will convert it to a digital format that you can now work with in JADE. Use advanced image editing options to tweak any imperfections or remove artifacts from your image.

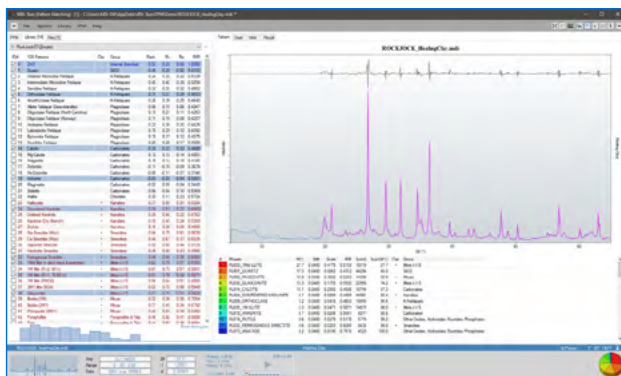


## Cluster Analysis ▲

Offers hierarchical Dendrogram Clustering with Principal Component Analysis in addition to Fuzzy Clustering.

## Charge Flipper + Solve Structure

For structure solution using the charge flipping method.



## Pattern Matching ▲

Try the full Pattern Matching method used in ROCKJOCK and ClaySim.

## Regression Analysis

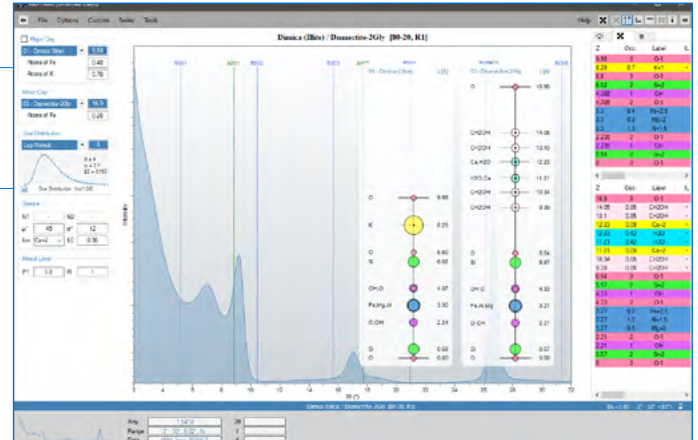
Perform regression analysis on data without leaving JADE Pro's Toolkit.

## 3D Scatter Plot

A scatter plot tool for xyz data sets from columnar data files.

## Lave Visualization ▶

Lave simulations, stereographic projections and alternative structure visualizations. This tool also exports multi-page Adobe PDF booklets.



## Microstructure Tool

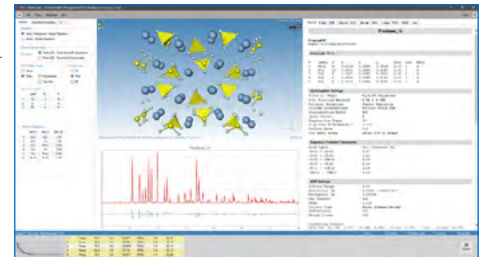
Provides methods for the analysis of the residual stress and microstructure defects for various diffraction geometries and is applicable to cubic phases (FCC, BCC) following a profile fitting in JADE (D. Rafaja).

## MDI SizeStrain

Designed for crystallite size and micro-strain analysis using X-ray powder diffraction data. This Toolkit supports both Warren-Averbach and Williamson-Hall methods for crystallite size determination.

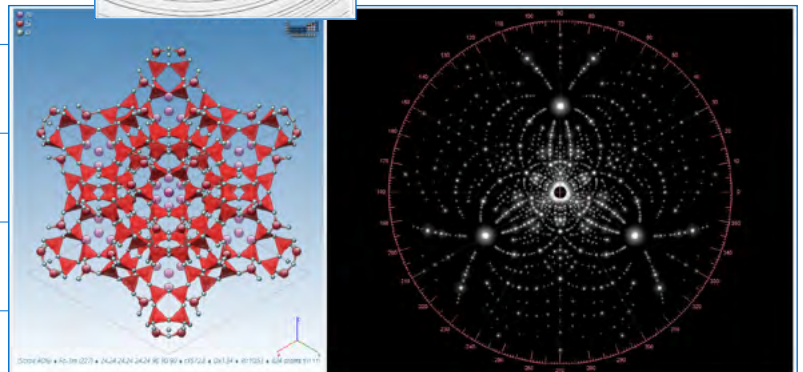
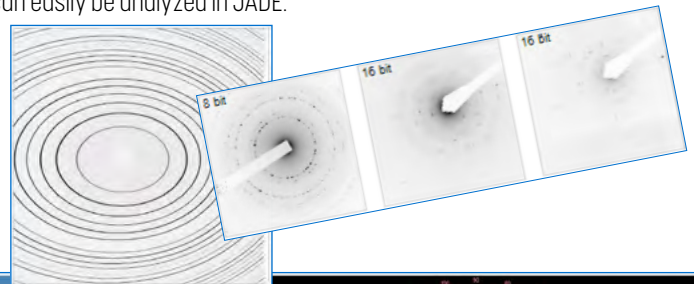
## Simulated Annealing ▶

An alternative direct space structure solution method (SA) designed for inorganic structures applying Coulomb interactions and repulsive potentials.



## Area Detector Tool ▼

Built to extract powder patterns from images obtained with flat area detectors, so that they can easily be analyzed in JADE.



# JADE Standard

JADE Standard provides a more limited set of tools than JADE Pro, but without the annual updates and renewal costs. Available in three levels -

1. Basic Level
2. Add either Phase ID (S/M) or WPF + Rietveld
3. Add both Phase ID (S/M) and WPF + Rietveld

Included with all levels of JADE Standard -

Simulation and Visualization - Simulate powder patterns to create your own custom database. Visualize a structure in 3D with motion. Visual cues throughout to better help you and your team understand the materials you are analyzing.

## KEY POINTS - ALL LEVELS

- Reads all vendor pattern files
- Handles variable/fixed-slit data
- Auto peak search and multi-filter search
- Simulate powder patterns from crystal structures
- No annual renewal fee
- Individually licensed for workstations
- Hardware Independent - supports a wide range of diffractometers

## PHASE ID (SEARCH/MATCH)

- Found in Levels
  - 2A: Search/Match
  - 3: Search/Match and Whole Pattern Fitting
- Phase Identification (S/M)
- Minor and Trace Phase ID

## WPF + RIETVELD

- Found in Levels
  - 2B: Whole Pattern Fitting (WPF)
  - 3: Search/Match and WPF
- WPF & Rietveld Refinement



Level 1	Level 2 (A or B)		Level 3 ...or choose JADE Pro, and get it all and more!
Base	Base	Base	Base
	Phase ID (S/M)		Phase ID (S/M)
		WPF + Rietveld	WPF + Rietveld

**Phase ID (SM) - JADE Standard** Level 2A or Level 3  
Profile-based Search/Match with minor and trace phase ID or search on a single peak. Ability to include chemistry filters and unit cell data as well as preferred-orientation.

**WPF + RIETVELD - JADE Standard** Level 2B or Level 3  
Quantify weight percentages and identify minor phases quickly and easily.



## JADE QA

A special build meant for production line Quantitative Analysis (QA) typically carried out by a technician. Requires a setup file created by an analytical scientist using JADE Pro. JADE QA runs independently of JADE Pro and was designed to extend the power of Rietveld Quantitative Analysis (QA) to those in your organization responsible for overseeing consistencies in production who may or may not have a background in XRD.



## Get More Power With JADE Pro

JADE is available in Pro and Standard

### JADE FEATURE LIST

	Pro	1	2A	2B	3
Intuitive, State-of-the-Art UI	✓	✓	✓	✓	✓
Reads All Vendor Pattern Files	✓	✓	✓	✓	✓
Smart Column Data Importer	✓	✓	✓	✓	✓
Merge Multi-Scans/Segments	✓	✓	✓	✓	✓
1, 2, and 3D Pattern Overlay	✓	✓	✓	✓	✓
Déjà Vu ID Similar Pattern Files	✓	✓	✓	✓	✓
Handles Variable/Fixed-Slit Data	✓	✓	✓	✓	✓
Multiple Display Axes and Any Diffraction Wavelength	✓	✓	✓	✓	✓
Zero Offset Correction and Theta Calibration	✓	✓	✓	✓	✓
Background Fitting/Batch Fitting/Removal	✓	✓	✓	✓	✓
Auto Peak Search and Multi-Filter Search	✓	✓	✓	✓	✓
Wide Variety of Report and Print Options	✓	✓	✓	✓	✓
Includes Starter Database	✓	✓	✓	✓	✓
ICDD PDF Database Access (as well as other databases)	✓	✓	✓	✓	✓
Multitude of Data Choices for Database Retrieval	✓	✓	✓	✓	✓
View Crystal Structures and Reflection Planes	✓	✓	✓	✓	✓
View Polyhedra, Calculate Bond Distances and Angles	✓	✓	✓	✓	✓
Simulate Powder Patterns from Crystal Structures	✓	✓	✓	✓	✓
Individual Analyst/Shared Work Environments	✓	✓	✓	✓	✓
Support for Custom d-I% list for Phase Overlay	✓	✓	✓	✓	✓
Excellent Profile Fitting and Batch Profile Fitting	✓	✓	✓	✓	✓
RIR Quant, Size & Strain and Residual Stress	✓	✓	✓	✓	✓
Quantitative Analysis	✓	✓	✓	✓	✓
Line-Based Unit Cell and Batch Refinement	✓	✓	✓	✓	✓
Structure Database Manager	✓	✓	✓	✓	✓
Profile Based Search/Match (S/M)	✓	✓	✓	✓	✓
Subfile + Chemistry + Unit Cell Filters in S/M	✓	✓	✓	✓	✓
Minor and Trace Phase ID	✓	✓	✓	✓	✓
Single Peak and Severely-Orientation S/M	✓	✓	✓	✓	✓
Solid-Solution and Isotypical Phase ID	✓	✓	✓	✓	✓
Auto-S/M in background thread on loading a pattern file	✓	✓	✓	✓	✓
Full pattern S/M on PD3 phases by correlation & similarity	✓	✓	✓	✓	✓
WPF and Rietveld Refinement (Unlimited Phases)	✓	✓	✓	✓	✓
Gold Standard Quantitative Analysis	✓	✓	✓	✓	✓
Seamless Integration with Database Retrieval	✓	✓	✓	✓	✓
Auto-Loading of Structure Data from Database	✓	✓	✓	✓	✓
Combination of Phases with/without Structure Data Weight%	✓	✓	✓	✓	✓
Linking of Unit Cell, Phase Broadening Parameters	✓	✓	✓	✓	✓
Custom d-I% (hkl, FWHM, Skew) to Fit Clay Phases	✓	✓	✓	✓	✓
March-Dollase and Spherical Harmonics Orientation Function	✓	✓	✓	✓	✓
Amorphous Content with/without Internal Wt% Standards	✓	✓	✓	✓	✓
Atomic Occupancy and Bond Distance Constraints	✓	✓	✓	✓	✓
Polynomial and Spline Curve Background Fitting	✓	✓	✓	✓	✓

All levels of JADE Standard are perpetual licenses and sold without the benefit of updates or any of JADE Pro's extensive set of extra features, like the ability to share a license. Since it is a subscription, JADE Pro has a lower buy-in than JADE Standard.



If you have JADE Classic, there still may be trade-in value for your JADE Classic towards the purchase of a current version of JADE Standard or JADE Pro.

### Additional JADE Features Only Available in JADE Pro

	Pro
One-Click-Analysis™ - Phase ID and WPF/Rietveld Analysis	✓
Size and Strain Analysis (Warren-Averbach & Williamson Hall)	✓
Pattern Indexing (All Crystal Systems)	✓
Simulate Series of Powder Patterns from Crystal Structures	✓
WPF and Rietveld Refinement Batch Processing	✓
Rietveld Structure Refinement (Atomic Parameters)	✓
Atomic Occupancy and Bond Distance Constraints	✓
Fourier Map Tools	✓
Ab Initio Tools (Charge Flipping +)	✓
Cluster Analysis of Powder Patterns	✓
Floating (Shareable) Network License	✓
All Updates via Subscription	✓
Extract Patterns from Area Detector 2D Images	✓
Digitize Any XRD Plot Image	✓
Cluster Analysis Visualization Dendrograms	✓
Toolkit App Version of ClaySim	✓
Toolkit App for Microstructure Analysis	✓
Toolkit App for Structure Solver Workflow	✓
Laue Simulations and Visualization	✓
Toolkit App for Simulated Annealing	✓
Toolkit App for Regression Analysis	✓
Toolkit App for Pattern Matching	✓
Toolkit App for 3D Scatter Plot	✓

### Multiple Languages!

To better support diverse teams sharing a license of JADE Pro across their organization and to ensure consistent results regardless of language, JADE can switch on the fly to Chinese or Japanese languages.

# SIEVE/SIEVE+ 2024

## Search and Identify

ICDD's search identification programs, Sieve for PDF-2 and Sieve+ for PDF-5+ and PDF-4, are designed to search and identify unknown materials. Sieve/Sieve+ are integrated into the ICDD databases to allow the use of the extensive data mining interfaces, searches, and sorts available to improve the accuracy and precision of the phase identification process.

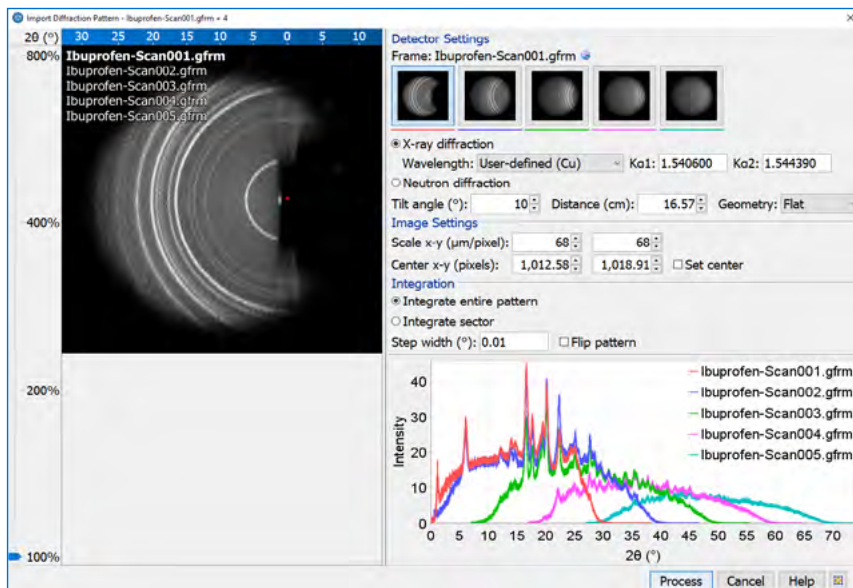
**New for 2024:**  
**All PDF databases now include Sieve/Sieve+ at no additional cost!**

## KEY POINTS

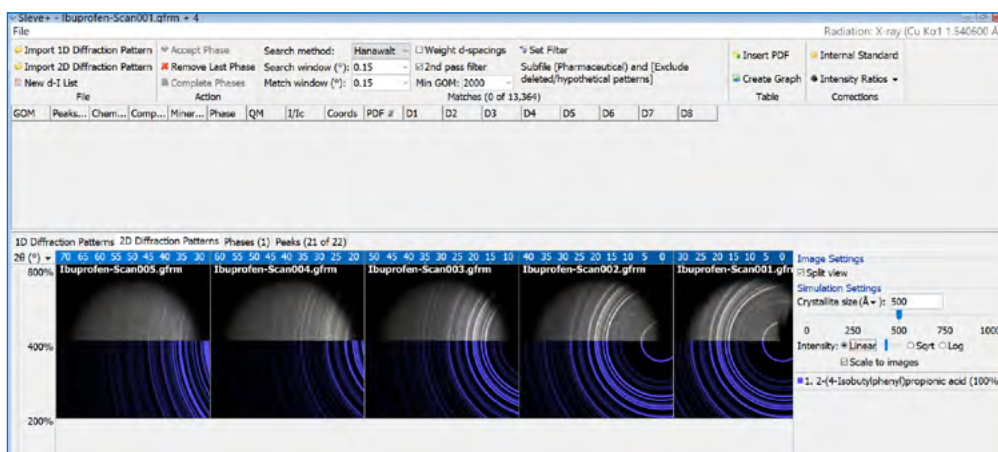
- Designed to search and identify unknown materials
- Complementary with most commercial software programs
- Match filter algorithms - better results, more accuracy
- Identify non-crystalline materials and complex multi-phase specimens
- Strength of Sieve/Sieve+ is evident in the analysis of minor and trace phases
- Supports X-ray, synchrotron, electron\*, and neutron\* data
- "Intelligent" RIR for semi-quantitative analysis\*

\*PDF-5+ only

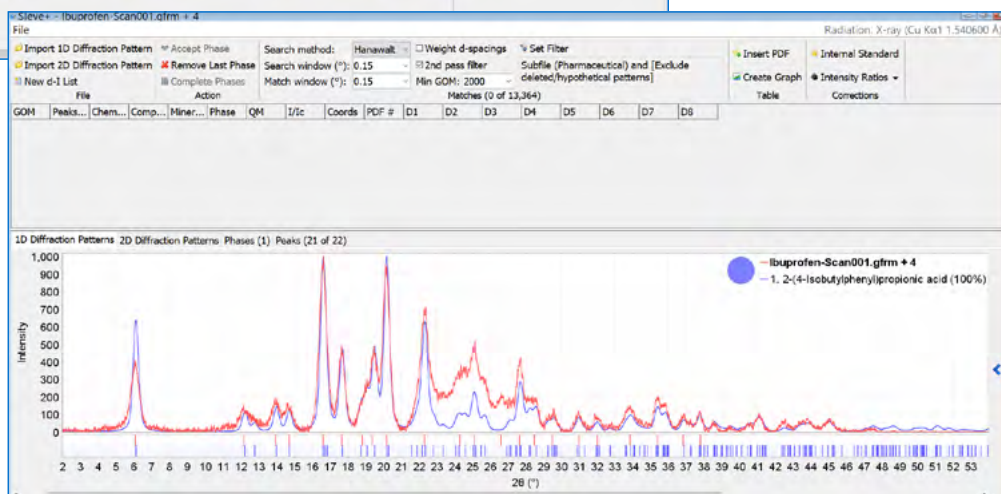
**Sieve+ offers a variety of algorithms and options that allow users to optimize results for particular chemistries for both standard and non-standard diffraction systems.**



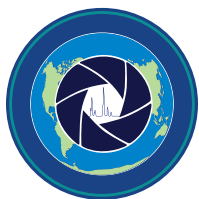
Sieve+ importation of five 2D diffraction patterns, integrated for phase identification analysis, ibuprofen API. (Data provided by S. Zdzieszynski and S. Misture, Alfred University).



Five 2D XRD data patterns with phase identification overlay using Sieve+ data collected on a single sample with diffraction detector positions.



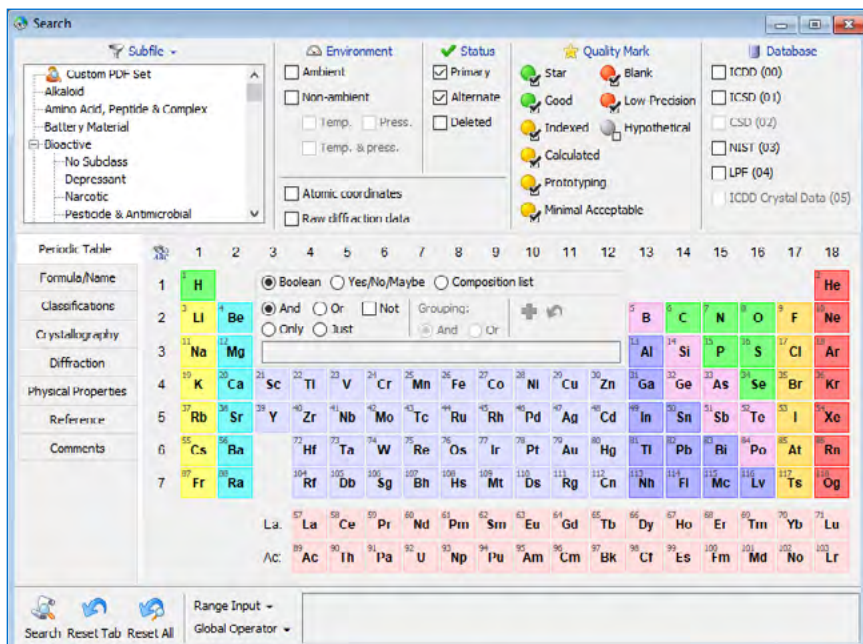
Phase identification results from 2D XRD data merged and plotted in 1D format.



# PDF-4/AXIOM 2024

## Quality plus Value

PDF-4/Axiom is focused on identification and quantitation with data entries selected for benchtop users.

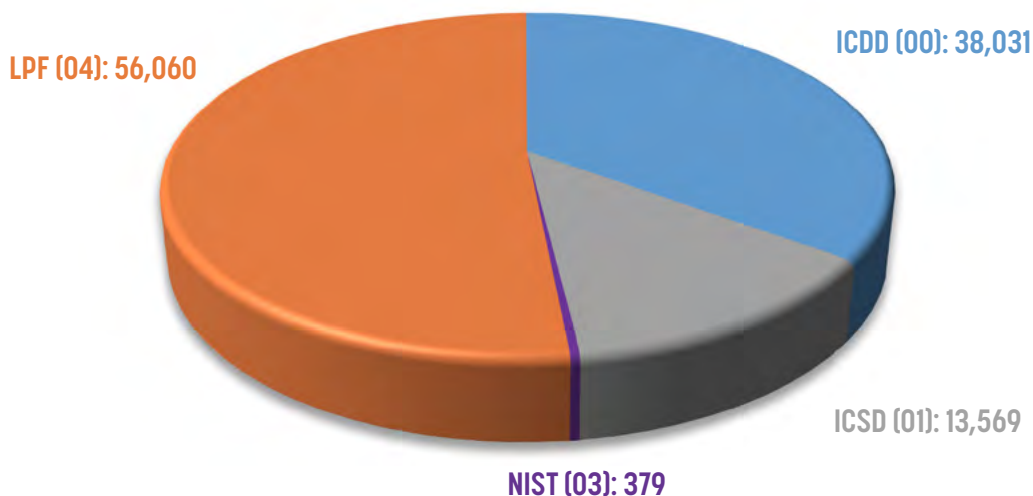


## KEY POINTS

- Cost-effective
- Single License: Three (3) year license term
- Optional: Two (2) additional seats (three (3) year license term)
- Six (6) year and nine (9) year prepaid packages available
- New license available after term expires
- Featuring 108,000+ entries, including inorganic and organic entries
- 78,500+ entries with atomic coordinates
- Data focused on ambient entries
- Fundamental mineral entries
- ICDD data mining software
- Steve+ Included

## Database Sources

(See inside front cover for ICDD's collaborative partners)



## PDF-4/Axiom Purchase Options

PDF-4/Axiom 2024	DVD CODE	USB CODE	DOWNLOAD CODE	2023-2024 List \$	2023-2024 Academic \$
New License - 3 years	AX4D24	AX4S24	AX4L24	\$3,715	\$2,665
Two Additional Seats (each seat: single PC installation)	AX4D24MS	AX4S24MS	AX4L24MS	\$1,050	\$540
<b>PDF-4/Axiom 2024 Packages*</b>					
PDF-4/Axiom - 6 years	AX4D6YR	AX4S6YR	AX4L6YR	\$7,430	\$5,330
PDF-4/Axiom - 9 years	AX4D9YR	AX4S9YR	AX4L9YR	\$11,145	\$7,995

\*Purchase two or three Single Licenses (Release 2024, Release 2027, and Release 2030)

- Each PDF-4/Axiom product is licensed for three (3) years

- Shipping fees for all databases billed on the original invoice

\*Please see product policies on pages 18 and 19



# PDF-4/MINERALS 2024

## Comprehensive Mineral Collection

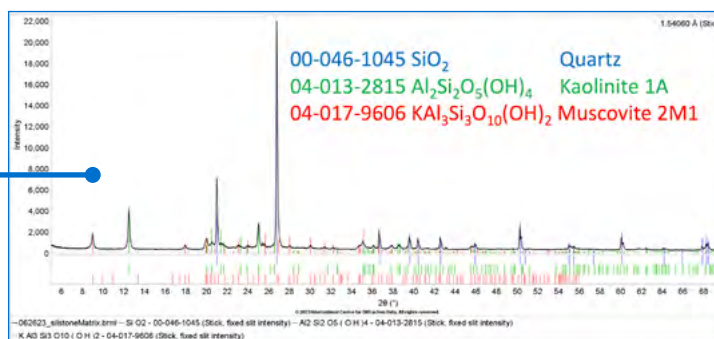
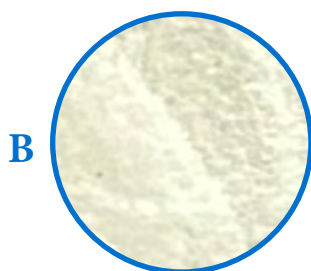
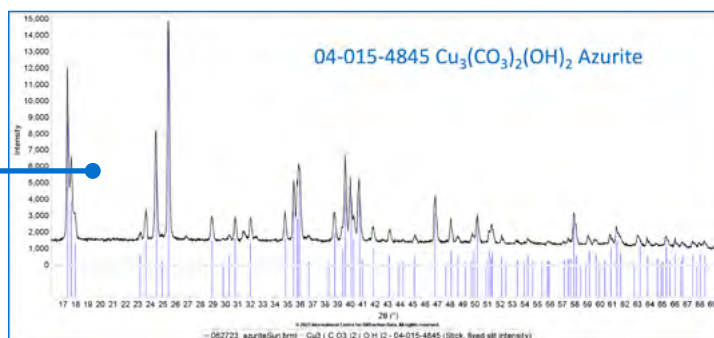
PDF-4/Minerals is the most comprehensive collection of mineral data in the world! Ninety-seven percent of all known mineral types, as defined by the International Mineralogical Association (IMA), are represented in the database.



Azurite suns on kaolinitic siltstone, Malbunka copper mine, Northern Territory, Australia.

## KEY POINTS

- Rapid phase identification, plus support for automated quantitative analyses
- Features 51,900+ entries, including 42,700+ entries with atomic coordinates
- Integrated data mining software
- All entries have digital patterns for use in total pattern analysis
- More than 40,100+ entries have  $I/I_c$  values for quantitative analysis by Reference Intensity Ratio (RIR)
- Combines powder and single crystal data
- Classified by IMA designations
- A subset of the PDF-5+ database with all the features and capabilities, targeted to minerals and mineral related compounds
- Extensive data mining is facilitated with 137 display fields coupled with 82 searches
- One (1) year license serviced by subscription



## PDF-4/Minerals Purchase Options

PDF-4/Minerals 2024	DVD CODE	USB CODE	DOWNLOAD CODE	2023-2024 List \$	2023-2024 Academic \$
New - Single License	MN4D24	MN4S24	MN4L24	\$1,840	\$1,250
Renewal from 2023 to 2024	MNR4D24	MNR4S24	MNR4L24	\$985	\$650
<b>PDF-4/Minerals 2024 Multi-year License*</b>					
Renewal - 3 year license	MND425MR27	MNS425MR27	MNL425MR27	\$2,955	\$1,950
Renewal - 5 year license	MND425MR29	MNS425MR29	MNL425MR29	\$4,925	\$3,250

\*Please see product policies on pages 18 and 19

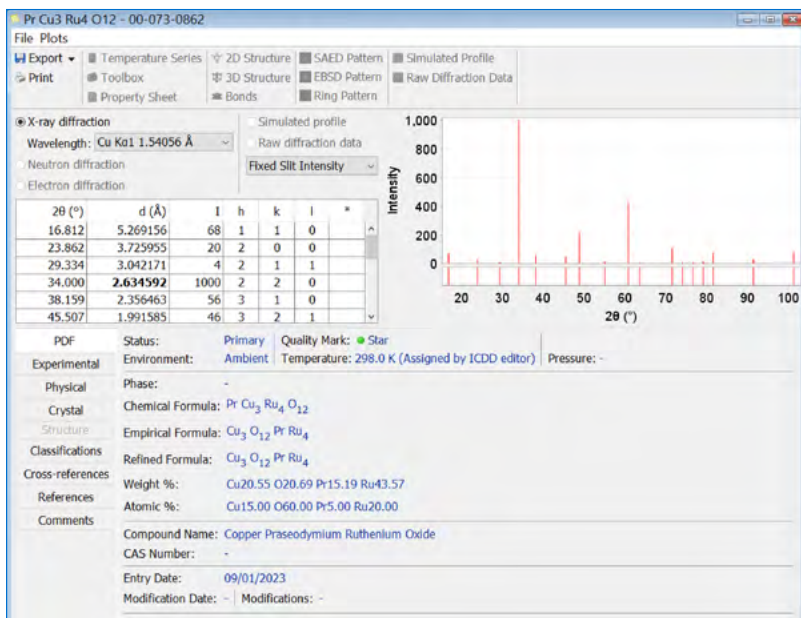




# PDF-2 2024

## Phase Identification + Value

PDF-2 is designed for inorganic materials analyses. In addition, common organic materials from ICDD are added to the database to facilitate rapid materials identification.



PDF-2 entry 00-073-0862, thermoelectric material, PrCu<sub>3</sub>Ru<sub>4</sub>O<sub>12</sub>

## KEY POINTS

- Features 349,700+ entries
- 244,500+ entries have  $I/I_c$  values for quantitative analysis by Reference Intensity Ratio (RIR) method
- Integrated data mining software
- Sieve search-indexing software included
- Combines powder and single-crystal data
- Rapid data mining with our 59 display fields coupled with 73 searches
- Five (5) year license

**Take Advantage of ICDD's PDF-2  
10-Year License Package  
REQUEST A QUOTE TODAY!**

## PDF-2 Purchase Options

PDF-2 2024: Five (5) year License	DVD CODE	USB CODE	DOWNLOAD CODE	2023-2024 List \$	2023-2024 Academic \$
New - Single License	C2D24PN	C2S24PN	C2L24PN	\$9,345	\$6,215
Renewal - from 2023 to 2024	C2D23PU24	C2S23PU24	C2L23PU24	\$2,065	\$1,325
Renewal - from 2022 to 2024	C2D22PU24	C2S22PU24	C2L22PU24	\$4,130	\$2,650
Renewal - from 2021 to 2024	C2D21PU24	C2S21PU24	C2L21PU24	\$6,195	\$3,975
Renewal - from 2020 to 2024	C2D20PU24	C2S20PU24	C2L20PU24	\$8,260	\$5,300
<b>PDF-2 2024: Ten (10) year License Package</b>					
New Licenses (2024 and 2029)	PD2D1OYR	PD2S1OYR	PD2L1OYR	\$18,690	\$12,430
Purchase Two (2) New PDF-2 Single Licenses (Release 2024, Release 2029)					
<b>PDF-2 2024 Site License*</b>					
New - Master License	C2D24PNM	C2S24PNM	C2L24PNM	\$9,345	\$6,215
New - additional licenses, each	C2D24PNC	C2S24PNC	C2L24PNC	\$2,065	\$1,325
Renewal - Yearly Master License	C2D23PU24M	C2S23PU24M	C2L23PU24M	\$2,065	\$1,325
Renewal - additional licenses, each	C2D23PU24C	C2S23PU24C	C2L23PU24C	\$805	\$540
<b>PDF-2 to PDF-5+ Conversion</b>					
PDF-2 2023 to PDF-5+ 2024	F2523RDU24	F2523RSU24	F2523RLU24	\$2,065	\$1,325
PDF-2 2022 to PDF-5+ 2024	F2522RDU24	F2522RSU24	F2522RLU24	\$4,130	\$2,650
PDF-2 2021 to PDF-5+ 2024	F2521RDU24	F2521RSU24	F2521RLU24	\$6,195	\$3,975
PDF-2 2020 to PDF-5+ 2024	F2520RDU24	F2520RSU24	F2520RLU24	\$8,260	\$5,300

\*Please see product policies on pages 18 and 19

# WHICH ICDD DATABASE IS RIGHT FOR YOU?

	PDF-5+ 2024	PDF-5+/WEB 2024	PDF-5+ Server Edition 2024	PDF-4/ Axiom 2024	PDF-4/ Minerals 2024	PDF-2 2024
I work primarily with inorganic compounds	✓	✓	✓	✓		✓
I work primarily with organic compounds	✓	✓	✓			
I work primarily with minerals					✓	
I work with electron diffraction/synchrotron	✓	✓	✓		✓	
I need to be flexible with my work location		✓	✓			
I need to do quantitative analysis						
Rietveld	✓	✓	✓	✓	✓	
Reference Intensity Ratio (RIR)	✓	✓	✓	✓	✓	✓
Pattern Fitting	✓	✓	✓	✓	✓	
I need a database with atomic coordinates	✓	✓	✓	✓	✓	
How many entries are in the database?	1,061,898*	1,061,898*	1,061,898*	108,039	51,939	349,762
How many entries are new?	42,081	42,081	42,081	2,761	989	10,213
<b>I am using vendor software for my analysis. Which databases will work with my vendor software?</b> Global software vendors provide search/match software that interfaces with our databases. Please check with your software vendor for compatibility.	✓	✓	✓	✓	✓	✓
What is the license term for the database?	1 year	1 year	1 year	3 year	1 year	5 year
Multi-year license available	✓	✓	✓		✓	
Site license available	✓	✓	✓†			✓

\* Contains inorganic and organic entries previously contained in PDF-4+ and PDF-4/Organics.

† Requires a 10 concurrent user minimum license.

**Do you have 10 or more concurrent users on a network? See pages 6 - 7 for Server License details.**

## SYSTEM REQUIREMENTS:

- Intel® Core™ 2 Duo processor (recommended minimum) or better
- 4 GB system memory

## JADE STANDARD/JADE PRO:

- Intel® Core™ i7, i5, or i3
- 8 GB system memory
- 24" or larger monitor - Your JADE experience will be richer on a larger screen.

## HARD DISK SPACE REQUIREMENTS

- PDF-2 2024 – 5 GB
- PDF-5+ 2024 – 35 GB
- PDF-5+/Web 2024 – 600 MB
- PDF-5+ Server Edition – 35 GB
- PDF-4/Minerals 2024 – 2 GB
- PDF-4/Axiom 2024 – 3 GB
- JADE Standard/JADE Pro – 400 MB

## SUPPORTED MICROSOFT® OPERATING SYSTEMS:

- Windows® 7 SP1
- Windows® 8/8.1
- Windows® 10
- Windows® 11

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GET YOUR 2024 PDF DATABASE BY  
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AND REDUCED DELIVERY TIME!



PDF-5+



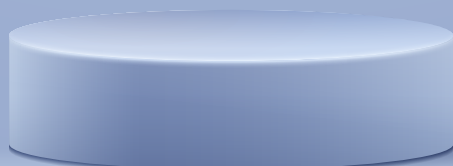
PDF-2



PDF-4/MINERALS



PDF-4/AXIOM



Contact [info@icdd.com](mailto:info@icdd.com) for more information

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- PDF-2 10-year license - prepaid package
- PDF-5+Scholar - 10-year license for Academics
- PDF-4/Axiom 6-year and 9-year license - prepaid packages
- **SAVE time and money with ICDD's PDF-5+ and PDF-4/Minerals Subscriptions**
  - ICDD's subscriptions keep your database up-to-date with renewal pricing
  - ICDD offers automatic PDF-5+ and PDF-4/Minerals renewal shipments for convenience
  - Can't accept automatic shipments? ICDD will send a PDF-5+ or PDF-4/Minerals renewal reminder to keep you up-to-date with your subscription

# LICENSE

ICDD single user databases and software products are licensed for use on a single PC (see page 5 in this catalog for information on PDF-5+/Web licensing). Database and software licenses grant end-users a limited, nonexclusive, and nontransferable license to access the contents of the product for personal or internal business purposes; and to download such contents on the hard drive of a single computer, as needed, to facilitate data processing. It cannot be installed, accessed, or displayed on more than one PC without purchasing additional licenses or a multi-user server license (see pages 6-7 for server license information). License terms vary by product.

**Installation & Registration:** ICDD databases require registration to comply with the legal requirements of our collaborative agreements. Registration is required upon installation. This will ensure that your database license will correspond closely with your product subscription. Please note that your product subscription is based on the month of the original invoice, not the date of the license registration key. The integrated registration software will guide users through the registration process. The registration information can be sent to ICDD using the internet (preferred), email, fax, or mail. A registration key for the full license will be sent to the user within 48 hours of receipt of the registration information (Monday through Friday). If you have not heard from ICDD within 48 hours, please send a communication noting that it is a second request. You can contact ICDD by email: [registration@icdd.com](mailto:registration@icdd.com); fax: 610.325.9823; or call us at 610.325.9814.

**Registration License Key:** Registration is required upon installation. The license key is issued on the date of registration and will allow access to the database in accordance with the purchased product license term.

Contact ICDD for PDF-5+/Web registration information - [registration@icdd.com](mailto:registration@icdd.com)

**Database License Term:** This is the amount of time available for access to the purchased database (see License terms).

## PRODUCT LICENSE POLICIES

### Academic Pricing Policy

An academic price is awarded to degree-granting (Assoc., B.S., M.S., Ph. D.) institutions and organizations that provide resources for student's course work that are affiliated with the degree-granting institution. Institutions may be required to submit documentation to verify eligibility. Please consult individual product pages for eligible products.

### Site License Policy

ICDD's standard site license policy is designed for a multi-user laboratory to facilitate multiple licenses of the PDF-2 or PDF-5+ databases at a single site. A single site is defined by the building where the database will be installed. Multiple users in different buildings need to purchase separate site licenses for each building.

**Product Subscription:** The PDF-5+ and PDF-4/Minerals, as well as all database site and multi-year licenses, are serviced by subscription. All subscriptions are based on the original invoice date. This means that PDF-5+ and PDF-4/Minerals renewals, site licenses, and multi-year licenses are due on the month of the original invoice. For example, if your original invoice was in May 2023, then your renewal will be due in May 2024.

**PDF-2:** The license term for PDF-2 with Sleva is five (5) years.

**PDF-4/Axiom:** The license term for PDF-4/Axiom is three (3) years.

**PDF-5+ and PDF-4/Minerals** are licensed for one (1) year. ICDD offers a subscription service that provides automatic renewals for your PDF product(s). Prior to the expiration of your license, ICDD will automatically invoice and ship your PDF-5+ and PDF-4/Minerals renewal based on your original invoice date. If you cannot take advantage of the automatic subscription, contact [sales@icdd.com](mailto:sales@icdd.com).

**NOTE:** When renewing your PDF license, ICDD recommends that you contact ICDD or your software vendor to determine your data analysis software requirements.

### RELEASE 2024

#### LICENSE TERMS

Product	License Term
PDF-2	5 years
PDF-4/Axiom	3 years
PDF-5+*	1 year
PDF-4/Minerals*	1 year

\* Serviced by subscription featuring automatic annual renewals.

A standard ICDD site license includes the purchase of a Master License, and the purchase of Secondary Licenses (discounted additional licenses). Customers may purchase an unlimited number of additional licenses at discounted pricing. The number of computers that will be running the database in a single building determines the number of licenses.

ICDD multi-user server licenses are software products that include ICDD's JADE Pro and/or PDF-5+. The server licenses are scaled to serve high-volume research environments (10-concurrent user license minimum required) and is a floating, remotely accessible, and network shareable license.

**Note: PDF-4/Axiom and PDF-4/Minerals are excluded from site license options. PDF-2 and PDF-5+ cannot be combined in a single site license.**

## Single License → Site License

Customers with a single license may add additional licenses to create a site. To qualify for additional license pricing, the single license must be current. If necessary, customers may need to renew their single license to the current release, then add an additional license to create the site.

## Site License Renewals

In order to take advantage of the site license renewal pricing, both the Master License and the Secondary Licenses of the database must be renewed yearly. To renew a site license, ICDD requires that the Master License and all Secondary Licenses be purchased concurrently on a single purchase order.

## Multi-year Site License

In response to customer requests, ICDD offers multi-year site licenses. The multi-year site license is offered as a convenience to our customers using site license pricing. This license is serviced by subscription and is available for a PDF-5+ or PDF-5+/Web site.

**Note:** (PDF-2, PDF-4/Axiom, and PDF-4/Minerals databases are not eligible).

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**Note:** PDF-2 and PDF-4/Axiom databases are not eligible for multi-year licensing options; however ICDD offers prepaid packages. Visit page 13 for PDF/Axiom and page 15 for PDF-2.

## PDF-5+Scholar Multi-year License for Academics 10-Year License



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The 10-Year license is available on DVD, USB, or download.

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## Take advantage of ICDD's prepaid packages:

- **PDF-2:** 10-Year license – Page 15
- **PDF-5+Scholar:** 10-Year license for Academics – Page 4
- **PDF-4/Axiom:** 6-Year and 9-Year license prepaid – Page 13

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\*Dates, location, and format of clinics and conferences may be subject to change.

## CONFERENCES\*

[www.icdd.com](http://www.icdd.com) → Conferences

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**The Westin Westminster, Westminster, Colorado, USA**  
**5-9 August 2024**

DXC is the world's largest annual conference dedicated to the fields of X-ray analysis. Experts in the fields of X-ray diffraction and X-ray fluorescence gather for a week of workshops, technical sessions, and manufacturer's exhibits. DXC attendees will have access to sessions on the latest advancements in XRD and XRF.

[www.dxcicdd.com](http://www.dxcicdd.com)

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[www.icdd.com/ppxrd](http://www.icdd.com/ppxrd)

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ICDD's international journal, *Powder Diffraction*, focuses on materials characterization employing X-ray powder diffraction and related techniques. Cambridge University Press publishes it quarterly and with special topical issues. See freshly approved manuscripts online - since 2013, authors have utilized First View to speed approval of their manuscripts.

[www.icdd.com/pdj](http://www.icdd.com/pdj)

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<b>technical support</b>	<a href="mailto:support@materialsdata.com">support@materialsdata.com</a>
<b>web</b>	www.materialsdata.com
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## Payment Terms

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The ICDD ships via INCOTERM: EXW / EXWORKS

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