



Chemical Indexing

Chemical Indexing	1
Table of Chemical Indexing Roles	3
Indexing Example.....	3
Function Role Definitions	4
Inspec Thesaurus Terms	4
Inspec Chemical Indexing Search Guide	5
Table of Vendor Search Examples.....	5
Inspec Vendor	5
DataStar	5
Dialog	6
Ebsco.....	7
EINS GEM	8
Engineering Village.....	9
FIZ Technik	10
Inspec OnDisc (Inspec Web)	11
ISI Web of Knowledge.....	12
OCLC FirstSearch	13
Ovid.....	14
Questel	15
SilverPlatter WebSPIRS.....	16
STN	17
Table of Chemical Elements and Their Symbols	18
Table of Chemical Groups and Their Formulae	20
Table of Abbreviations and Their Corresponding Formulae	21

Chemical Indexing is found in appropriate Inspec database records from the start of 1987. It is a controlled indexing system for inorganic substances and material systems.¹

Inspec Chemical Indexing is designed to deal with a number of problems which arise in searching for chemical substances. These include:

- substances which occur in solid-state physics, such as gallium aluminium arsenide, which may be represented in a variety of ways, including GaAlAs or AlGaAs or $Ga_xAl_{1-x}As$ or $(GaAs)_{0.5}(AlAs)_{0.5}$, meaning that it is impracticable to enter all the necessary search terms for comprehensive retrieval. Inspec

¹ If you want to search for organic compounds, you should use the compound name and search within the uncontrolled indexing field.

Chemical Indexing solves this by allowing you to search for any system containing gallium, aluminium and arsenic regardless of the original stoichiometry.

- some chemical element symbols or molecular formulae which have the same spellings as common English words, or may be ambiguous as they can be used as acronyms to represent other concepts, or may even be identical to Online Vendor system commands. For example gallium phosphide has the molecular formula GaP which also spells the English word gap, beryllium has the chemical element symbol Be which is the English verb "to be" (found in approximately one third of all Inspec records) but also the acronym for Boltzman Equation or Beta-Emission line. Inspec Chemical Indexing solves these problems because only chemical information appears in the Inspec Chemical Indexing field.
- the lack of differentiation between upper and lower case characters in the majority of Online Vendor search systems, leading to ambiguity when searching a molecular formula whose characters may also be used to represent a chemical element, such as cobalt and carbon monoxide, both represented by the letters c and o. Use of the Inspec Chemical Indexing role for an element will differentiate cobalt Co from carbon monoxide, the binary system, CO.

Furthermore, you have a range of search options because Inspec applies Chemical Indexing to each inorganic substance or material system at three levels. For example, you could retrieve references to sulphuric acid, H₂SO₄, by using strategies including:

- H₂SO₄ itself because the whole substance or system is indexed,
- Any substance containing an SO₄ group or alternatively an H₂ group because the components are indexed, and
- Any substance containing H, S, and O because the individual elements making up the substance or system are indexed.

To enable you to distinguish between references to a component as an element or as a part of a more complex system, each indexed term has an associated role. These roles are:

Table of Chemical Indexing Roles

Basic Roles	Abbreviation	Function Roles	Abbreviation
Element	EL	Adsorbate	ADS
Binary System	BIN	Dopant	DOP
System of >2 components	SS	Interface System	INT
		Surface/Substrate	SUR

Indexing Example

For the interface system Au-LiNbO₃

- The complete system with its role is indexed
 - e.g. Au-LiNbO₃/int
- Any substances or material subsystems contained above are indexed with their roles
 - e.g. LiNbO₃/int Au/int LiNbO₃/ss Au/el
- Any chemical groups with their roles are indexed
 - e.g. NbO₃/int NbO₃/ss
- Chemical elements with any numbers (integers and decimals only) associated with composition, and their roles are indexed
 - e.g. O₃/int O₃/ss
- Chemical elements with their roles are indexed
 - e.g. Au/int Li/int Nb/int O/int Li/ss Nb/ss O/ss Au/el

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04788290  INSPEC Abstract Number: A91010684
Title: Linear and nonlinear SH surface acoustic waves
Controlled Indexing: crystal surface and interface vibrations; gold;
lithium compounds; surface acoustic waves
Uncontrolled Indexing: nonlinear SH surface acoustic waves; linear
shear horizontal surface acoustic waves; envelope dark solitons;
superimposed linear elastic thermodynamical interface; nonlinear
dispersion relation; transverse modal behavior; Au-LiNbO/sub 3/;
LiNbO/sub 3/
Chemical Indexing:
Au-LiNbO3 int - LiNbO3 int - NbO3 int - Au int - Li int - Nb int - O3
int - O int - LiNbO3 ss - NbO3 ss - Li ss - Nb ss - O3 ss - O ss - Au
el (Elements - 1,3,4)
LiNbO3 sur - NbO3 sur - Li sur - Nb sur - O3 sur - O sur - LiNbO3 ss
- NbO3 ss - Li ss - Nb ss - O3 ss - O ss (Elements - 3)

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Figure 1: Sample Inspec Record from Dialog - selected fields

If a given system contains two elements, then it is a binary system even if one of the elements is only a very minor component like a dopant.

Function Role Definitions

Role	Example	Criteria
adsorbate	CO/ads	Used for species being (ads)sorbed.
dopant	Si:P (Si doped by P)	Used for systems into which an impurity is diffused and those in which the impurity is a probe.
interface	InGaP-InAlP	Semiconductor junctions, devices, integrated circuits, electrochemical batteries, etc.
surface	Fe/sur	Used for surface or substrate, e.g. oxidation, corrosion, wear of iron.

To search for inorganic substances in documents added to the Inspec database before 1987, you should use the controlled and uncontrolled indexing fields. The controlled indexing field contains terms from the Inspec Thesaurus. See below for further details. The uncontrolled indexing field contains formulae rather than names of the substance, and will use the terminology of the original document.

Inspec Thesaurus Terms

Each chemical element has its own Inspec Thesaurus Term² e.g. HYDROGEN, GALLIUM, etc. which can be used to search for documents relating to studies of the indexed element. Many elements have Inspec Thesaurus Terms for their compounds, e.g. ALUMINIUM COMPOUNDS, MERCURY COMPOUNDS, etc. In addition, the Inspec Thesaurus has broader and narrower chemical terms such as ALKALI METAL COMPOUNDS, GALLIUM ARSENIDE, MIXED VALENCE COMPOUNDS, etc. Inspec use the most specific Inspec Thesaurus Terms to index documents. Therefore use of a broad term will not automatically retrieve documents indexed with narrower terms. Several Inspec Vendor search systems allow thesaurus terms to be "exploded" i.e. for a chosen thesaurus term to be searched along with all of its narrower terms automatically. Please consult the Inspec Thesaurus either Online or via the Inspec Search Aids CD-ROM for appropriate search terms and to see whether your chosen Vendor offers the "explode" feature. Use of the Inspec thesaurus terms allows retrieval of documents back to 1969.

² Inspec Thesaurus Terms use British English spelling and terminology, hence there is an Inspec Thesaurus Term SULPHUR which will be used for sulfur, ALUMINIUM for aluminum, etc.

Inspec Chemical Indexing Search Guide

Table of Vendor Search Examples

Inspec Vendor	Inspec Database including Chemical Indexing	Chemical Indexing Search Field	Chemical Indexing Roles	Chemical Indexing Search Examples
DataStar	INSP (1987 ->) INZZ (1969 ->)	.CI.	-EL -BIN -SS -ADS -DOP -INT -SUR	<p><i>Search a single component:</i></p> <p>BE-EL.CI.</p> <p><i>Search multiple components within a multicomponent system:</i></p> <p>GA-SS WITH AL-SS WITH AS-SS.CI.</p> <p>where WITH indicates within the same indexing field.</p>

Inspec Vendor	Inspec Database including Chemical Indexing	Chemical Indexing Search Field	Chemical Indexing Roles	Chemical Indexing Search Examples
Dialog	2 (1898 ->) 3 (1969 ->) 4 (1983 ->)	CI=	EL BIN SS ADS DOP INT SUR	<p><i>Search a single component:</i></p> <p>S CI=BE EL S CI=SI – for the component in any role</p> <p><i>Search multiple components within a multicomponent system:</i></p> <p>S CI=(GA SS(S)AL SS(S)AS SS)</p> <p>where S indicates within the same indexing sentence.</p> <p><i>Note: Additional Dialog generated field, NE= for Number of Elements, may be used. Use NE= to limit a search of, for example, 3 components to systems that only have 3 elements in total, i.e. NE=3. Use (S) to link CI to NE, e.g.</i></p> <p>S CI=(AL SS(S)GA SS(S)AS SS)(S)NE=3</p>

Inspec Vendor	Inspec Database including Chemical Indexing	Chemical Indexing Search Field	Chemical Indexing Roles	Chemical Indexing Search Examples
Ebsco	Inspec	CI	/EL /BIN /SS /ADS /DOP /INT /SUR	<p><i>Search a single component:</i></p> <p>CI BE/EL CI SI - - for the component in any role</p> <p><i>Search multiple components within a multicomponent system:</i></p> <p>CI GA/SS N5 AL/SS N5 AS/SS</p> <p>where N5 indicates within the same indexing field and with up to five words between terms in any order</p>

Inspec Vendor	Inspec Database including Chemical Indexing	Chemical Indexing Search Field	Chemical Indexing Roles	Chemical Indexing Search Examples
EINS GEM	8	/CI	EL BIN SS ADS DOP INT SUR	<p><i>Search a single component:</i></p> <p>S BE EL/CI S SI/CI – for the component in any role</p> <p><i>Search multiple components within a multicomponent system:</i></p> <p>S ((GA SS)(S)(AL SS)(S)(AS SS))/CI</p> <p>where S indicates within the same indexing sentence.</p> <p><i>Note: Additional EINS GEM generated fields may be used, ELC for Element Count and ET for Element Terms. Use ELC to limit a search of, for example, 3 components to systems that only have 3 elements in total, i.e. 3/ELC. Use (L) to link CI to ELC, e.g.</i></p> <p><i>S (AL SS(S)GA SS(S)AS SS)/CI(L)3/ELC</i></p>

Inspec Vendor	Inspec Database including Chemical Indexing	Chemical Indexing Search Field	Chemical Indexing Roles	Chemical Indexing Search Examples
Engineering Village	Inspec	WN CI	/EL /BIN /SS /ADS /DOP /INT /SUR	<p><i>Search a single component:</i></p> <p>BE/EL WN CI SI WN CI - for the component with any role</p> <p><i>Search multiple components within a multicomponent system:</i></p> <p>(GA/SS NEAR/2 AS/SS NEAR/2 AS/SS) WN CI</p> <p>where NEAR/2 indicates within the same indexing sentence and up to 2 terms in between.</p> <p><i>Note: Only available in Expert search.</i></p>

Inspec Vendor	Inspec Database including Chemical Indexing	Chemical Indexing Search Field	Chemical Indexing Roles	Chemical Indexing Search Examples
FIZ Technik	INSP (1996 ->) IN95 (1969 to 1995) INSZ (1969 ->)	.CI	/EL /BIN /SS /ADS /DOP /INT /SUR	<p><i>Search a single component:</i></p> <p>BE/EL.CI SI.CI</p> <p><i>Search multiple components within a multicomponent system:</i></p> <p>(GA/SS SAME AL/SS SAME AS/SS).CI</p> <p>where SAME indicates within the same indexing sentence.</p> <p><i>Note: Only available in Advanced search.</i></p>

Inspec Vendor	Inspec Database including Chemical Indexing	Chemical Indexing Search Field	Chemical Indexing Roles	Chemical Indexing Search Examples
Inspec OnDisc (Inspec Web)	Inspec (1989 to date only)	CH{ }	/EL /BIN /SS /ADS /DOP /INT /SUR	<p><i>Search a single component:</i></p> <p>CH{Be/EL} CH{Si/*} – for the component with any role</p> <p><i>Search multiple components within a multicomponent system:</i></p> <p>CH{Ga/SS .-5. Al/SS .-5. As/SS}</p> <p>where .-5. indicates within 5 terms, in any order.</p> <p><i>Note: For Inspec Web only, the Chemical Indexing field is case sensitive.</i></p>

Inspec Vendor	Inspec Database including Chemical Indexing	Chemical Indexing Search Field	Chemical Indexing Roles	Chemical Indexing Search Examples
ISI Web of Knowledge	Inspec	CH=	/EL /BIN /SS /ADS /DOP /INT /SUR	<p><i>Search a single component:</i></p> <p>CH=(Be/EL) CH(SI) – for the component with any role</p> <p><i>Search multiple components within a multicomponent system:</i></p> <p>CH=(GA/SS SAME AI/SS SAME AS/SS)</p>

Inspec Vendor	Inspec Database including Chemical Indexing	Chemical Indexing Search Field	Chemical Indexing Roles	Chemical Indexing Search Examples
OCLC FirstSearch	Inspec	CI:	W EL W BIN W SS W ADS W DOP W INT W SUR	<p><i>Search a single component:</i></p> <p>CI: (BE W EL) CI: (SI) – for the component with any role</p> <p><i>Search multiple components within a multicomponent system:</i></p> <p>CI: (GA W SS) AND CI: (AL W SS) AND CI: (AS W SS)</p> <p>where W indicates within the same indexing sentence and in any order.</p> <p><i>Note: Only available in Advanced and Expert Search.</i></p>

Inspec Vendor	Inspec Database including Chemical Indexing	Chemical Indexing Search Field	Chemical Indexing Roles	Chemical Indexing Search Examples
Ovid	Inspec	.CH.	-EL -BIN -SS -ADS -DOP -INT -SUR	<p><i>Search a single component:</i></p> <p>BE-EL.CH. SI.CH. – for the component with any role</p> <p><i>Search multiple components within a multicomponent system:</i></p> <p>(GA-SS ADJ10 AL-SS ADJ10 AS-SS).CH.</p> <p>where ADJ10 indicates within 10 terms, in any order.</p>

Inspec Vendor	Inspec Database including Chemical Indexing	Chemical Indexing Search Field	Chemical Indexing Roles	Chemical Indexing Search Examples
Questel	Inspec	/MF	/EL /BIN /SS /ADS /DOP /INT /SUR	<p><i>Search a single component:</i></p> <p>/MF BE/EL /MF SI – for the component with any role</p> <p><i>Search multiple components within a multicomponent system:</i></p> <p>/MF GA/SS S AL/SS S AS/SS</p> <p>where S indicates within the same indexing sentence.</p> <p><i>Search multiple components within an interface system:</i></p> <p>/MF "TiO:B"/INT</p> <p>N.B. When searching interface systems on Questel the request should be enclosed in quote marks as above.</p>

Inspec Vendor	Inspec Database including Chemical Indexing	Chemical Indexing Search Field	Chemical Indexing Roles	Chemical Indexing Search Examples
SilverPlatter WebSPIRS	Inspec	IN CI	-EL -BIN -SS -ADS -DOP -INT -SUR	<p><i>Search a single component:</i></p> <p>BE-EL IN CI SI-* IN CI – for the component with any role</p> <p><i>Search multiple components within a multicomponent system:</i></p> <p>(GA-SS WITH AL-SS WITH AS-SS) IN CI</p> <p>where WITH indicates within the same indexing sentence.</p>

Inspec Vendor	Inspec Database including Chemical Indexing	Chemical Indexing Search Field	Chemical Indexing Roles	Chemical Indexing Search Examples
STN	Inspec	/CHI	EL BIN SS ADS DOP INT SUR	<p><i>Search a single component:</i></p> <p>S BE EL/CHI S SI/CHI – for the component with any role</p> <p><i>Search multiple components within a multicomponent system:</i></p> <p>S (AL SS(S)AL SS(S)AS SS)/CHI</p> <p>where S indicates within the same indexing sentence.</p> <p><i>Note: Additional STN generated fields may be used, ELC for Element Count and ET for Element Terms. Use ELC to limit a search of, for example, 3 components to systems that only have 3 elements in total, i.e. 3/ELC. Use (L) to link CHI to ELC, e.g.</i></p> <p>S (AL SS(S)GA SS(S)AS SS)/CHI(L)3/ELC</p>

Table of Chemical Elements and Their Symbols

Element	Symbol	Element	Symbol	Element	Symbol
actinium	Ac	hafnium*	Hf	praseodymium	Pr
aluminium	Al	hahnium (<i>now dubnium</i>)	Ha (<i>now Db</i>)	promethium	Pm
americium	Am			protactinium	Pa
antimony	Sb	hassium	Hs	radium	Ra
argon	Ar	helium	He	radon	Rn
arsenic	As	holmium* hydrogen <i>see also</i> <i>deuterium,</i> <i>tritium</i>	Ho H	rhenium	Re
astatine	At			rhodium	Rh
barium	Ba			roentgenium	Rg
berkelium	Bk			rubidium	Rb
beryllium	Be			ruthenium	Ru
bohrium	Bh	indium*	In	rutherfordium	Rf
bismuth	Bi	iodine	I	samarium	Sm
boron	B	iridium	Ir	scandium*	Sc
bromine	Br	iron	Fe	seaborgium	Sg
cadmium	Cd	krypton	Kr	selenium	Se
caesium*	Cs	lanthanum	La	silicon*	Si
calcium	Ca	lawrencium	Lr	silver	Ag
californium*	Cf	lead*	Pb	sodium	Na
carbon	C	lithium	Li	strontium	Sr
cerium	Ce	lutetium	Lu	sulphur	S
chlorine	Cl	magnesium	Mg	tantalum	Ta
chromium	Cr	manganese	Mn	technetium	Tc
cobalt*	Co	meitnerium	Mt	tellurium	Te
copper	Cu	mendelevium	Md	terbium	Tb
curium	Cm	mercury	Hg	thallium	Tl
deuterium <i>see also</i> <i>hydrogen</i>	D	molybdenum	Mo	thorium	Th
		neodymium	Nd	thulium	Tm
		neon	Ne	tin*	Sn
darmstadtium	Ds	neptunium*	Np	titanium	Ti
dubnium	Db	nickel*	Ni	tritium <i>see also</i> <i>hydrogen</i>	T
dysprosium	Dy	niobium*	Nb		
einsteinium	Es	nitrogen	N		
erbium	Er	nobelium*	No	tungsten	W
europium	Eu	osmium*	Os	uranium	U
fermium	Fm	oxygen	O	vanadium	V
fluorine	F	palladium	Pd	xenon	Xe

³Certain element symbols when searched with the binary role, give ambiguous results, e.g. the letters c and o in a binary system could be the element cobalt within a binary system, or the binary system carbon monoxide. To differentiate the binary system, it is good practice to search both the binary system whole and one of the elements within the binary system, e.g. search CO/BIN AND C/BIN which will retrieve records where a carbon binary system is indexed, that system being CO. Alternatively combine the Chemical Indexing search with a search of the appropriate Inspec Thesaurus Term, e.g. S (CI=CO BIN) AND DE=CARBON COMPOUNDS. Searches of binary and multicomponent systems using the element symbols indicated by * in the table above need searching this way.

⁴ Where an element symbol or a molecular formula matches a database field label or search system proximity operator, it may be necessary to enclose the search in quotes. For example, on OCLC the title field label is TI. This is the same as the element symbol for titanium. On OCLC search it as CI: "TI" W EI. See individual Vendor Inspec data sheets for details.

francium	Fr	phosphorus	P	ytterbium*	Yb
gadolinium	Gd	platinum	Pt	yttrium	Y
gallium	Ga	plutonium	Pu	zinc	Zn
germanium	Ge	polonium*	Po	zirconium	Zr
gold	Au	potassium	K		

Table of Chemical Groups and Their Formulae

Chemical Group Name	Chemical Group Formula	Chemical Group Name	Chemical Group Formula
alumina	Al ₂ O ₃	iron garnet	Fe ₅ O ₁₂
aluminium garnet	Al ₅ O ₁₂	<i>see also ferrite</i>	
arsenate	AsO ₄	magnesate	MgO ₃
arsenate	As ₂ O ₃	manganate	MnO ₄
bismuthate	Bi ₂ O ₃	molybdate	MoO ₄
borate	BO ₄	niobate	NbO ₃
borate	B ₂ O ₃	niobate	Nb ₂ O ₅
borate	B ₃ O ₆	niobate	Nb ₂ O ₇
borate (per-)	BO ₃	nitrate	NO ₃
bromate	BrO ₃	nitrite	NO ₂
carbonate	CO ₃	phosphate (ortho-)	PO ₄
carbonyl	CO	phosphate	P ₂ O ₅
chromate (di-)	Cr ₂ O ₇	phosphate (pyro-)	P ₂ O ₇
chromate (per-)	CrO ₃	phosphite	PO ₃
/cyanide	CN	phosphite	P ₄ O ₁₂
ferrite	Fe ₂ O ₃	selenate	SeO ₄
ferrite	Fe ₂ O ₄	selenite	SeO ₃
ferrite	Fe ₃ O ₄	silica	SiO ₂
ferrite (ortho) <i>see also iron garnet</i>	FeO ₃	silicate	SiO ₄
		sulphate	SO ₄
gallium garnet	Ga ₅ O ₁₂	sulphate (thio-)	S ₂ O ₃
garnet (aluminium)	Al ₅ O ₁₂	sulphite	SO ₃
garnet (gallium)	Ga ₅ O ₁₂	tantalate	TaO ₃
garnet (iron)	Fe ₅ O ₁₂	titanate	TiO ₃
germanate	GeO ₂	tungstate	WO ₃
germanate	GeO ₃	tungstate	WO ₄
hydroxyl	OH	vanadate	V ₂ O ₅
hydroxyl (deuterated)	OD	vanadate (meta-)	VO ₃
iodate	IO ₃	vanadate (ortho-)	VO ₄
		zirconate	ZrO ₃

Table of Abbreviations and Their Corresponding Formulae

Abbreviation	Formula	Abbreviation	Formula
ADP	NH ₄ N ₂ PO ₄	KSP	KSnOPO ₄
AG	Al ₅ O ₁₂	KTP	KTiOPO ₄
BBO	BaB ₂ O ₄	LMN	PbMgO ₃ NbO ₃
BEL	La ₂ Be ₂ O ₅	NASI <i>or</i>	NaZrSiO ₄ PO ₄
BPSG	B ₂ O ₃ -P ₂ O ₅ -SiO ₂	NASICON	
BSG	B ₂ O ₃ -SiO ₂	PLZT	PbLaZrO ₃ TiO ₃
BSN	NaBaNb ₂ O ₆	PMN	PbMgO ₃ NbO ₃
BSO	Bi ₁₂ SiO ₂₀	PSG	P ₂ O ₅ -SiO ₂
DKDP	KD ₂ PO ₄	PZT	PbZrO ₃ TiO ₃
GG	Ga ₅ O ₁₂	SBN	SrBaNb ₂ O ₆
IG	Fe ₅ O ₁₂	YAP	YAlO ₃
ITO	InSnO	YLF	LiYF ₄
KDP	KH ₂ PO ₄	ZBLAN	ZrF ₄ -BaF ₂ -LaF ₃ - AlF ₃ -NaF
KNSBN	KNaSrBaNb ₂ O ₆	ZBLANP	ZrF ₄ -BaF ₂ -LaF ₃ - AlF ₃ -NaF-PbF ₂