

STN[®]

Locating Information on Materials on STN[®]

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STN

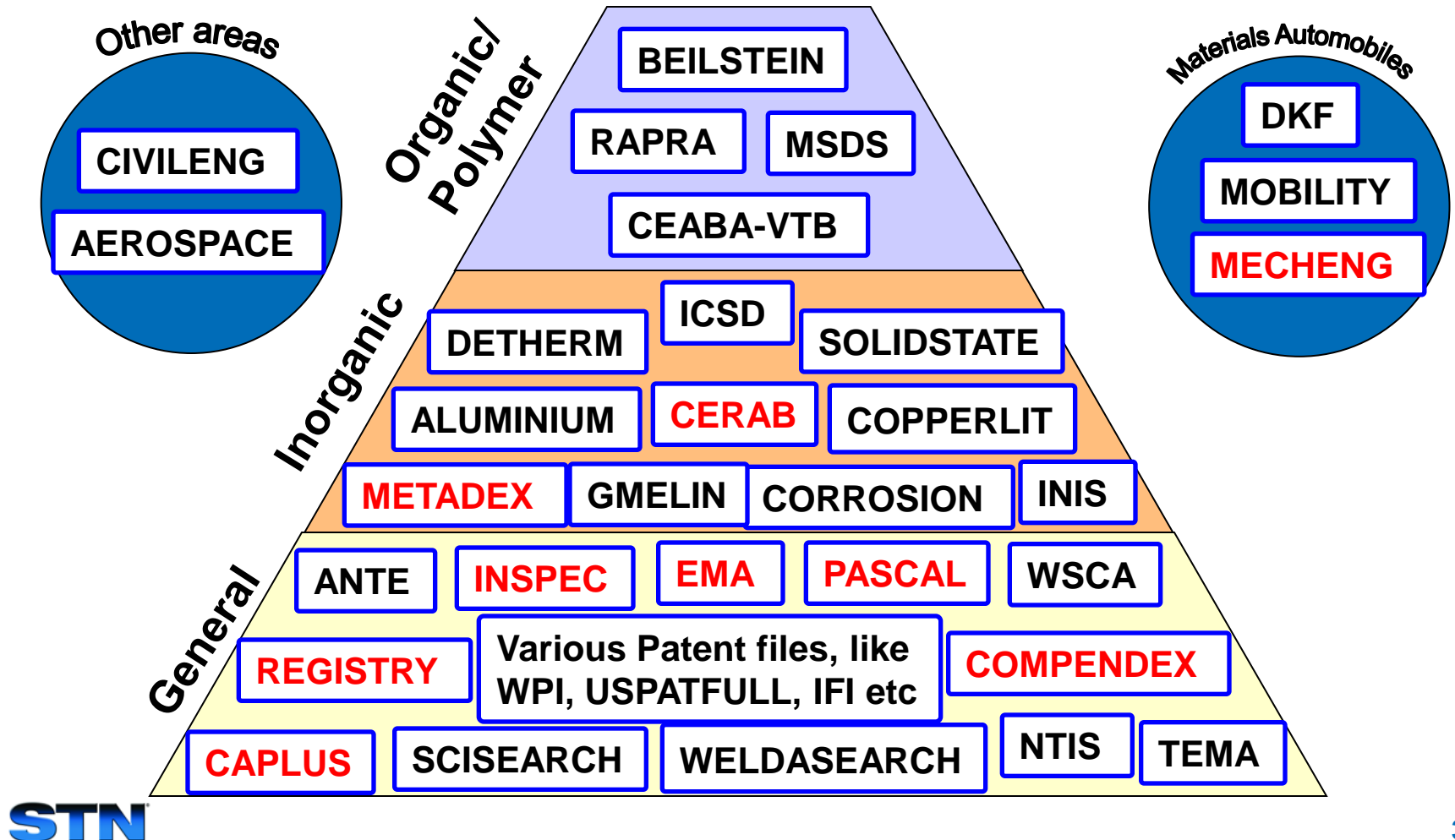
STN is available through FIZ Karlsruhe, Germany
and Chemical Abstracts Service, U.S.A.

Agenda

In this e-Seminar you will get:

- An Overview on Materials databases available on STN
- Information on specific STN commands and features to precise your search
- Search examples to highlight special content fields in Materials databases

STN offers many resources for finding information on Materials



INSPEC Database

- Over 12,5 million records (Dec. 2010)
- Over 5.000 journals, books, reports, conference
 - 93 countries covered
- 1898 to date
 - Additional Archive extends coverage back to 1898 and adds 873,699 records
- Chemical Indexing
 - Controlled indexing system for inorganic substances and material systems designed to overcome a number of problems which arise in searching for chemical substances in uncontrolled index terms.
- Value added Fields
 - Diverse indexing with thesaurus functionality
 - Element Terms
 - Enhanced titles

STN option:

FILE INSPEC

includes all data from 1898 onwards.

FILE 69INSPEC

contains data from 1969 onwards.

COMPENDEX Database

- Over 10,1 million records (Dec. 2010)
- 1969 to date
- Over 5.600 journals, books, reports, conference contributions and other non-conventional literature
 - Publications from over 55 countries
- Engineering Index Thesaurus (English / German edition)
- Element terms

CSA (Cambridge Scientific Abstracts) on STN

Lifescience

AQUALINE
AQUASCIENCE
BIOENG
HEALTHSAFE
LIFESCIENCE
LISA
OCEAN
POLLUAB
CONFSCIENCE

Technology

Materials

ALUMINIUM
CERAB
CORROSION
COPPERLIT
EMA
MATBUS
METADEX

High Tech

ANTE
AEROSPACE
COMPUAB
ELCOM

Engineering

CIVILENG
ENVIRONENG
MECHENG

Producer: ProQuest

Benefits: Indexed by a common list of controlled vocabulary

Author e-mails, published URLs

METADEX Database

- Over 2,2 million records (Dec. 2010)
- 1966 to date
- 3.000 journals, conference contributions, books, reports, and other non-conventional literature
- Speciality: Alloy Indexing Thesaurus
- Companion files:
 - EMA: Engineering materials
 - MATBUS: Technico-commercial developments in metals and materials
 - MDF: Numeric data on ferrous and non-ferrous alloys

REGISTRY Database

- More than 56 million organic and inorganic substances (Jan. 2011)
- 1907 to date
- Alloys described as mixtures of metals with other metals, nonmetals, gases or nonmetallic subst.
- Speciality: Materials Composition field /MAC

=> Corresponding bibliographic and patent information available in the CA databases

How can Materials be searched in bibliographic files

- Search in Basic Index
 - Specific STN search functionality
 - Use of SET commands
 - INDEX search
 - Multifile search
- Search in special content fields
 - Prepared / produced by database producers
 - Enhanced by database suppliers

Multiple STN search tools allow enhanced precision in materials queries (1)

- Crossfile / multiframe search strategies (INDEX search)
- Use SET commands to precise and customize
 - SET spellings
 - SET plurals
 - SET abbreviations
 - SET cluster
 - SET duporder file
- Proximity search (A, W, S, L...)
- Left and right hand truncation
- Use FOCUS command to sort for relevant results

Several files on STN include information on Materials

=> INDEX MATERIALS

Use **STNINDEX** to locate databases with relevant content

```
INDEX '1MOBILITY, 2MOBILITY, ALUMINIUM, ANTE, APOLLIT, BABS, CAPLUS, CBNB,  
      CEABA-VTB, CERAB, CIN, CIVILENG, COMPENDEX, COPPERLIT, CORROSION,  
      DKF, EMA, ENERGY, HEALSAFE, IFIPAT, INIS, INSPEC, INSPHYS, MATBUS,  
      MDF, MECHENG, METADEX, MSDS-OHS, ...'  
ENTERED AT 16:57:04 ON 18 AUG 2010
```

44 FILES IN THE FILE LIST IN STNINDEX

=> SET ABB ON PERM

=> SET PLU ON PERM

=> SET SPELL ON PERM

Use **SET commands** to customize your search strategy and loginid (with PERM)

=> S METAL?(A)?CERAMIC?(A)?MATRIX?

L1 QUE METAL?(A)?CERAMIC?(A)?MATRIX?

Define your own cluster including information on Materials

=> D RANK

F1	176	USPATFULL
F2	130	CAPLUS
F3	46	IFIPAT
F4	36	INSPEC
F5	36	METADEX
F6	30	USPAT2
F7	27	EMA
F8	18	COMPENDEX
F9	13	MECHENG
F10	12	CERAB
F11	11	SCISEARCH
F12	10	ENERGY
F13	10*	ALUMINIUM
F14	7	PASCAL

Rank the databases according to the ones that have the highest occurrence of hits.

Define your own cluster with SET CLUSTER .NAME

. . .

=> SET CLUSTER .COMPOSITE

ENTER LIST OF FILE NAMES OR (?):CAPLUS INSPEC METADEX EMA COMPENDEX MECHENG
CERAB PASCAL

MORE FILES, (NONE) OR ?:. .

CLUSTER '.COMPOSITE' DEFINED AS 'CAPLUS, INSPEC, METADEX, EMA, COMPENDEX,
MECHENG, CERAB, PASCAL'

SET COMMAND COMPLETED

Use your own cluster for multi-file searching

```
=> FIL .COMPOSITE

=> S L1
L2          130 FILE CAPLUS
L3           36 FILE INSPEC
L4           36 FILE METADEX
L5           27 FILE EMA
L6           18 FILE COMPENDEX
L7           13 FILE MECHENG
L8           12 FILE CERAB
L9            7 FILE PASCAL

TOTAL FOR ALL FILES
L10          279 S L1

=> SET DETAIL ON

=> S L10 AND ALUMINIUM
FILE 'CAPLUS'
    20190 ALUMINIUM
     37 ALUMINIUMS
    20219 ALUMINIUM
        (ALUMINIUM OR ALUMINIUMS)
    1179071 ALUMINUM
     323 ALUMINUMS
    1179140 ALUMINUM
        (ALUMINUM OR ALUMINUMS)
    1186531 ALUMINIUM
        (ALUMINIUM OR ALUMINUM)
L11          46 L2 AND ALUMINIUM

FILE 'INSPEC' . . .
```

Open your own cluster and use your search strategy from INDEX.
Note: the full stop is important!

Due to SET SPELL ON all different spellings of ALUMINIUM are searched.

Eliminate duplicates

TOTAL FOR ALL FILES

L19 92 L10 AND ALUMINIUM

=> SET DUPORDER FILE

=> DUP REM L19

PROCESSING COMPLETED FOR L19

L29 78 DUP REM L19 (14 DUPLICATES REMOVED)

ANSWERS '1-46' FROM FILE CAPLUS

ANSWERS '47-54' FROM FILE INSPEC

ANSWERS '55-63' FROM FILE METADEX

ANSWERS '64-70' FROM FILE EMA

ANSWERS '71-74' FROM FILE MECHENG

ANSWERS '75-78' FROM FILE CERAB

=> D 54 TI HIT

L29 ANSWER 54 OF 78 INSPEC (C) 2010 IET on STN

TI The effect of processing parameters on the growth rate and microstructure of Al₂O₃/metal matrix composites

AB Ceramic matrix composites can be formed by the directed oxidation of a doped molten **aluminum** alloy into an inert reinforcement or filler. The resultant ceramic matrix consists of interconnected Al₂O₃ and partially interconnected metal. The growth kinetics of this Al₂O₃/**metal ceramic matrix** can be altered by numerous parameters. The effect of the growth atmosphere composition and temperature on the composite growth rate is dependent on the alloy dopant utilized. The ceramic matrix formation rate is also dependent on the alloy composition. Likewise, alloy composition has a profound effect on the mechanical properties and microstructure of the composites produced

SET DUPORDER FILE keeps the records in file order.

Sort answers by relevance with FOCUS

=> FOCUS 129

PROCESSING COMPLETED FOR L29

L30 78 FOCUS L29 1-

=> D HIT

L30 ANSWER 1 OF 78 CAPLUS COPYRIGHT 2010 ACS on STN

TI **Aluminum metal-ceramic matrix** composites reinforced by using
electroless nickel plating on ceramic particles and fibers

AB The effect of hard particle (Al₂O₃, SiC, ZrO₂) metalizing is studied in
terms of their wettability, interfacial bond strength and reactivity, and
composite hardness and wear properties. Electroless Ni coating improves
the wettability between SiC, Al₂O₃, ZrO₂ and liq. Al alloy.

FOCUS command sorts your
answer set by relevance.

How can materials be searched in bibliographic files

- Search in Basic Index
 - Specific STN search functionality
 - Use of SET commands
 - INDEX search
 - Multifile search
- Search in special content fields
 - Created by database producers
 - Enhanced by database suppliers

Multiple STN search tools allow enhanced precision in materials queries (2)

- **Controlled terminology thesauri**

- INSPEC Thesaurus, EI Thesaurus, (CA Lexicon)

- **Chemical Indexing**

- INSPEC Chemical Indexing, **Element Terms**, (CAS REGISTRY)

- **Alloy Indexing**

- METADEX Alloy Indexing and Alloy Classification

- **Materials Composition**

- REGISTRY numbers to specific alloy compositions

Special Content Fields

Element Terms:	INSPEC, COMPENDEX etc.
Chemical Indexing:	INSPEC
Alloy indexing:	METADDEX
Thesauri :	EMA,COMPENDEX etc.
Materials Composition:	REGISTRY (⇒CAPLUS)

Files with Element Terms (/ET)

```
AN      2010:11379856  INSPEC
TI      Optimum and applications of photorefractive spatial light modulator in
        optical pattern recognition
ET      Bi*O*Si; Bi sy 3; sy 3; O sy 3; Si sy 3; Bi12SiO20; Bi cp; cp; Si cp; O
        cp; Ba*O*Tl; Ba sy 3; Ti sy 3; BaTiO3; Ba cp; Ti cp; As*Ga; As sy 2;
        sy 2; Ga sy 2; GaAs; Ga cp; As cp
```

CERAB

COMPENDEX

EMA

INIS

INSPEC

INSPHYS

MATBUS

METADEX

Ceramic Abstracts (1976-)

Ei COMPENDEX File (1970-)

Engineered Materials Abstracts File (1986-)

International Nuclear Information System (1970-)

The Database for Physics, Electronics and
Computing (1969-)

INSPEC- PHYS Supplement Backfile (1979 - 1994)

Materials Business File (1983-)

Metals Abstracts/Alloy Index (1966-)

FIZ Karlsruhe adds special content field "/ET" to files covering materials

- Character-string-recognition algorithm scans title and abstract data for special characters or strings
- Generation of separate index field /ET during file loading process
- This algorithm recognizes and analyzes:
 - Chemical formulas
 - Material descriptions
 - Alloys and eutectic systems
 - Nuclear reactions, isotopes
 - Material dopings

ET field entries cover a variety of inorganic and organic systems

Entry in ET field	Definition
Ba cp	compounds
sy 3	Systems e.g. n=3 (n>= 2 metals, semimetals)
As*Ga	elements in Hill Order
Si:P, doped materials	material dopings, e.g. Phosphorus doping of silicon

Chemical Indexing (/CHI) in INSPEC

```
AN      2009:10635305  INSPEC
TI      Measurements of natural radionuclides in soil samples from upper Egypt
CHI     U el; Th el; Pb el; Bi el; Ac el; TI bin, I bin, T bin, TI el, I el, T
        el; K el; Ra el
```

- Chemical indexing system started in 1987
- The field /CHI is a controlled indexing field.
- CHI for inorganic substances and material systems.
- indexed for each system or compound down to the level of elements.

Chemical Indexing (/CHI)...

- Each index term is associated with a *role indicator*:
 - **el** element
 - **bin** binary system
 - **ss** system with 3 or more components
 - **int** interface system
 - **dop** dopant
 - **sur** surface or substrate
 - **ads** adsorbate, or any sorbate

In addition FIZ Karlsruhe has implemented the fields
Periodic Groups / PG and Element Count / ELC

Searching for specific materials

Search Question:

I would like to get an overview on references describing nanowires consisting of tin oxide (SnO₂).

Overall Search Strategy

- Step 1. Search in INSPEC: Controlled Terms, Chemical Indexing and Element Terms
- Step 2. Search in EMA Controlled Terms and Element Terms
- Step 3. Search in COMPENDEX: Controlled Terms and Element Terms
- Step 4. Removal of Duplicates: DUP REM

Several files on STN include information on Materials

```
=> FIL INSPEC
```

```
=> E NANOWIRES/CT
```

E#	FREQUENCY	AT	TERM
--	-----	--	----
E1	2173	11	NANOTUBE DEVICES/CT
E2	3441	10	NANOTUBES/CT
E3	14491	17 -->	NANOWIRES/CT

/CT Controlled terms: best way for finding relevant records

```
oooo
```

```
=> E E3+ALL
```

E13	1192	BT2	materials/CT
E14	83476	BT1	nanostructured mat
E15	14491	-->	nanowires/CT

Exploring the controlled terms thesaurus (with the command E = Expand) for other related terms

		DA	January 2003
E16	0	UF	semiconductor nanowires/CT
E17	721	RT	nanocontacts/CT
E18	1537	RT	quantum wires/CT
E19	9080	RT	semiconductor quantum wires/CT
E20	2217	RT	wires/CT
E21	83476	PT	nanostructured materials/CT
E22	1537	PT	quantum wires/CT

```
oooo
```

Using Chemical Indexing field for this search question

```
=> S E15 OR E18 OR E19 OR E22
      14491 NANOWIRES/CT
      1537 "QUANTUM WIRES"/CT
      9080 "SEMICONDUCTOR QUANTUM WIRES"/CT
      1537 "QUANTUM WIRES"/CT
L1    22296 NANOWIRES/CT OR "QUANTUM WIRES"/CT OR
      "SEMICONDUCTOR QUANTUM WIRES"/CT OR "QUANTUM
      WIRES"/CT
```

```
=> E SNO2/CHI
```

```
E31      2      SNO1.8:AG/CHI
E32      2      SNO1.8:AG SS/CHI
E33     6773 --> SNO2/CHI
E34      6      SNO2 ADS/CHI ooo
```

/CHI Chemical Indexing,
only available in INSPEC

```
=> E SN BIN/CHI
```

```
E43     47094    SN/CHI
E44      213     SN ADS/CHI
E45    18754 --> SN BIN/CHI
E46     2016     SN DOP/CHI
ooo
```

SN BIN = Binary system
of Tin

The Element Term field may find additional records

=> E SNO2/ET

```
E55          3      SNO1.8/ET
E56          2      SNO1.8:AG/ET
E57        8790 --> SNO2/ET
E58          2      SNO2 /ET
E59          1      SNO2 -SWNT/ET
E60          2      SNO2 : F/ET
E61         203     SNO2 DOPING/ET
ooo
```

Searching Basic Index picks up some less relevant records but also some not yet indexed or before Controlled Term was applied.

=> S (L1 OR (NANOWIRE OR NANO WIRE)) AND (SNO2/CHI OR SNO2/ET) AND SN BIN/CHI

```
4864 NANOWIRE
9609 NANOWIRES
9958 NANOWIRE
      (NANOWIRE OR NANOWIRES)
```

o o o

```
L2          261 (L1 OR (NANOWIRE OR NANO WIRE)) AND (SNO2/CHI OR
              SNO2/ET) AND SN BIN/CHI
```

Display of Title and some indexing fields of records

=> FOCUS

PROCESSING COMPLETED FOR L2
L3 261 FOCUS L2 1-

=> D TI IND

L3 ANSWER 1 OF 261 INSPEC (C) 2010 IET on STN
TI Toxic gas response of (In,Sn)O₂/Pt nanowire sensors
AN 2005:8660079 INSPEC
CC A8280T Chemical sensors; A6855 Thin film growth, structure, and epitaxy;
B7230L Chemical sensors
B82B0001/00 Nano-structures
F41 Weapons
CT gas sensors; nanowires; thin film devices; tin compounds; toxicology;
weapons
ST nanowire sensors; toxic gas response; thin film gas sensor; dimethyl
methylphosphonate; simulant gas; nerve gas; blood gas; sensing material;
tin oxide film; alumina substrate; nano-wire structure; chemical
warfare agent; SnO₂; Pt
IPC B82B0001-00; F41
CHI SnO₂ int, O₂ int, Sn int, O int, SnO₂ bin, O₂ bin, Sn bin, O bin; Pt el
ET O; Sn; O*Sn; SnO; Sn cp; cp; O cp; In; O₂; C*H*O*P; C₃H₉O₃P; C cp; H cp;
P cp; C*H*N; CH₃CN; N cp; Pt; SnO₂

Searching file EMA (Engineered Materials Abstracts)

=> **FIL EMA**

=> **E NANOWIRES/CT**

E67	114	NANOTRIBOLOGY/CT
E68	2619	NANOTUBES/CT
E69	2820	--> NANOWIRES/CT
E70	31	NAPHTHA/CT
E71	278	NAPHTHALENE/CT ooo

Other databases including information of materials in the ET field: METADEX, CERAB etc.,

=> **S NANOWIRES/CT AND SNO2/ET**

L4 46 NANOWIRES/CT AND SNO2/ET

=> **S (NANOWIRE OR NANO WIRE) AND SNO2/ET**

L5 54 (NANOWIRE OR NANO WIRE) AND SNO2/ET

=> **S L5 NOT L4**

L6 8 L4 NOT L3

Comparison results of /BI with /CT

=> **S L4 OR L5**

L7 54 L4 OR L5

Some retrieved EMA records

=> D L6 1-3 KWIC=5

L6 ANSWER 1 OF 8 EMA COPYRIGHT 2010 CSA on STN

AB. . . particularly interesting when grown in **nanowire** shape (SnO₂-NW) because of their. . .

ET. . . sy 4; W sy 4; **SnO₂**; Sn cp; cp; O cp;. . .

L6 ANSWER 2 OF 8 EMA COPYRIGHT 2010 CSA on STN

TI. . . Novel fabrication of an SnO₂ **nanowire** gas sensor with high sensitivity

AB We fabricated a **nanowire**-based gas sensor using a simple method of growing SnO₂ **nanowires** bridging the gap between two. . . the electrical contacts to the **nanowires** are self-assembled during the synthesis of the **nanowires**. The gas sensing capability of. . . to the potential barrier at **nanowire/nanowire** junctions as well as the. . . surface depletion region of each **nanowire**.

ET O*Sn; **SnO₂**; Sn cp; cp; O cp;. . . NO; N cp; NO₂; O*Sn; **SnO₂**; Sn cp; cp; O cp

L6 ANSWER 3 OF 8 EMA COPYRIGHT 2010 CSA on STN

TI. . . templating synthesis of mesoporous and **nanowire** SnO₂ lithium battery anode materials

AB Mesoporous and **nanowire** SnO₂ anode materials for lithium. . . current rates. The as-prepared SnO₂ **nanowires** had a diameter of 6. . . its higher surface area than **nanowire** SnO₂. Especially, the capacity retention. . . with 31% for the SnO₂ **nanowires** at a 10 C rate. . .

ET O*Sn; **SnO₂**; Sn cp; cp; O cp;. . . is; C is; Sn; O*Sn; **SnO₂**; Sn cp; cp; O cp

Search strategy for Compendex and Removal of Duplicates

=> **FIL COMPENDEX**

=> **S (NANOWIRE OR NANOWIRES/CT) AND (SNO2 OR SNO2?/ET) NOT SN SY 3 /ET**

L8 290 NANOWIRES/CT AND (SNO2 OR SNO2/ET) NOT SN SY 3 /ET

Example for a slightly different search strategy: NOT SN SY3/ET = no systems with 3 elements

=> **DUP REM L2 L7 L8**

FILES 'INSPEC, EMA, COMPENDEX' ENTERED

3 FILES IN THE FILE LIST

L9 452 DUP REM L2 L7 L8 (153 DUPLICATES REMOVED)

ANSWERS '1-261' FROM FILE INSPEC

ANSWERS '262-287' FROM FILE EMA

ANSWERS '288-452' FROM FILE COMPENDEX

Removal of Duplicates in order of database

Display of one record from each database

=> D TI ET 4 262 292

L9 ANSWER 4 OF 452 INSPEC (C) 2010 IET on STN DUPLICATE 4
TI Ultraviolet photodetectors made from SnO2 nanowires
ET O; Sn; O*Sn; SnO; Sn cp; cp; O cp; Al; Al*O; Al2O; Al cp; SnO2; O2; C

L9 ANSWER 262 OF 452 EMA COPYRIGHT 2010 CSA on STN DUPLICATE 52
TI Doping-Dependent Electrical Characteristics of SnO2 Nanowires
ET O*Sn; SnO2; Sn cp; cp; O cp

L9 ANSWER 292 OF 452 COMPENDEX COPYRIGHT 2010 EEI on STN
TI Plasma-modified SnO2 nanowires for enhanced gas sensing
ET O*Sn; SnO; Sn cp; cp; O cp; O*Sn; SnO; Sn cp; cp; O cp; Ar

Alloy Indexing (/ALI) and Alloy Classification (/CCA)

METADEX

Each alloy, system or compound is indexed in the field *alloy indexing* /ALI together with *classification codes of alloys* /CCA

(since 1974)

```
ALI  S17C  CCA:  SCL  ;  
    INCONEL 800 CCA:  NI,  SP
```

SCL = **LOW CARBON STEELS**
NI = **NICKEL BASE ALLOYS**
SP = **SUPERALLOYS**

Alloy Indexing (/ALI) and Alloy Classification (/CCA)

EXPAND shows *code* CCA and the corresponding *code text*.

/CCA is divided in three parts:

- alloys
- steels
- ferrous and nonferrous alloys.

E.g. hierarchical structure for **STEELS**

Steels	S
Alloy steels	SA
Nickel steels	SAN
Nickel chromium steels	SANC
Nickel chromium molybdenum steels	SANCM

Alloy Indexing (/ALI) and Alloy Classification (/CCA)

=> S SANCM/CCA

L1 13283 SANCM/CCA

Nickel chromium molybdenum steels

L1 ANSWER 1 OF 13283 METADEX COPYRIGHT 2010 CSA on STN

AN 2010(06):45-1596194 METADEX

TI Development of Forged Bar of Steel X10CrNiMoV12-2-2 for Turbine Blade.

AU Wu, Jiangfeng; Chen, Xinjian; Zhang, Fufei

SO Teshugang (Special Steel) (20091100), vol. 30, 6, pp. 47-48

Published by: State Administration of Metallurgical Industry20091100

ISSN: 1003-8620

DT Journal

CY China

LA Chinese

AB Steel X 10CrNiMoV 12-2-2 (%)

CC 45 Ferrous Alloy Production

CT Nickel chromium molybdenum steels; Corrosion resistant steels; High strength low alloy steels; Steels; Forges; Forged; Ferrite; Electrodes; Inclusions; Ratings; Iron and steel industry;

ALI X10CrNiMoV12-2-2

CCA SANCM Nickel chromium molybdenum steels

ET Cr*Mo*Ni*V; Cr sy 4; sy 4; Mo sy 4; Ni sy 4; V sy 4; CrNiMoV; Cr cp; cp; Ni cp; Mo cp; V cp; Cr*Mo*Ni*V; Cr sy 4; sy 4; Mo sy 4; Ni sy 4; V sy 4; CrNiMoV; Cr cp; cp; Ni cp; Mo cp; V cp; Cr*Mo*Ni*V; Cr sy 4; sy 4; Mo sy 4; Ni sy 4; V sy 4; CrNiMoV; Cr cp; cp; Ni cp; Mo cp; V cp

Unique on STN: A searchable entry for Relative Composition in METADEX

=> S AL*TI*FE/ALI AND RAPID?(3A)SOLID?
L2 4 AL*TI*FE/ALI AND RAPID?(3A)SOLID?

AL*TI*FE only searchable,
not displayable!

=> D ALL

L2 ANSWER 1 OF 4 METADEX COPYRIGHT 2010 CSA on STN
AN 2004(11):12-2204 METADEX
TI Influence of Cr element addition on microstructure and microhardness of
rapidly solidified Al-Ti-Fe alloy.
AU Cao, Q. (Shanghai Jiaotong University (China)); Chen, Y.; Su, Y.; Zhou, Y.
SO Xiyou Jinshu Cailiao yu Gongcheng (Rare Metal Materials and Engineering)
(2004), vol. 33, (3), pp. 279-284, Spectra, Photomicrographs, Diffraction
Patterns, Graphs, 9 ref.
DT Journal
CY China
LA Chinese
AB **Rapidly solidified** Al-2.5Ti-2.5Fe and Al-2.5Ti-2.5Fe-2.5Cr alloys were
prepared by a melt spinning method. As-quenched and as-annealed . . .
CC 12 Crystal Properties
CT Journal Article; Aluminum base alloys; Microstructure; Chromium;
Microhardness; Melt spinning; Doping; Alloying effects; **Rapid
solidification**
ALI **Al-2.5Ti-2.5Fe CCA: AL; Al-2.5Ti-2.5Fe-2.5Cr CCA: AL**
; ALLOY3 Al 2.5 Ti 2.5 Fe CCA: AL; ALLOY4 Al 2.5 Ti 2.5 Fe 2.5 Cr CCA: AL
ET Cr; Al*Fe*Ti; Al sy 3; sy 3; Fe sy 3; Ti sy 3; Al-Ti-Fe; Al-2.5Ti-2.5Fe;
Al*Cr*Fe*Ti; Al sy 4; sy 4; Cr sy 4; Fe sy 4; Ti sy 4;
Al-2.5Ti-2.5Fe-2.5Cr

Materials Composition (/MAC)

- **REGISTRY** CAS Registry File of Substances

also:

MRCK

The Merck Index Online (SM)

MDF

Metals DataFile

GMELIN

Gmelin Handbook of Inorg. Chem.

Materials Composition (/MAC)...

- CAS describes alloys as mixtures of metals with other metals, nonmetals, gases, or nonmetallic substances.
- CAS Registry Numbers to specific alloy compositions started in 1972.
- Most alloys are described via their *weight* percent compositions.
- For example: => `S(FE 74 AND CR 18 AND NI 8)/MAC`
- Would retrieve alloys with `74% Fe, 18% Cr and 8% Ni`

For more information
enter:

```
=> HELP MAC  
=> HELP ALLOYS  
=> HELP RC
```

Materials Composition (/MAC)

Alloys may to be searched

- on the basis of their *composition*,
- by specification of the desired *components*,
- and their *weight percentages*.

Alloy components may be specified via

- element symbols
- Line formulas
- CA Index Names
- CAS Registry Numbers

Percentages may be

- single values
- ranges
- relationships

Typical /MAC queries :

=> S 90-95 Fe/MAC

=> S (Fe 65 and Cr 21 and Ni 10)/MAC

=> S AL2O3 >= 85/MAC

=> S ALUMINUM OXIDE <= 5/MAC

=> S 0-5 GRAPHITE/MAC

=> S < 5 1344-28-1/MAC

Search for iron nickel alloys with a high content of nitrogen

```
=> S Fe 75-88/MAC AND Ni 2-5/MAC AND N >8/MAC
601202 FE/MAC
      235041 75-88/MAC
      104630 FE 75-88/MAC
              (FE/MAC (P) 75-88/MAC)
      368057 NI/MAC
      487543 2-5/MAC
      56274  NI 2-5/MAC
              (NI/MAC (P) 2-5/MAC)
      43803  N/MAC
      985089 MAC > 8
      1263  N >8/MAC
              (N/MAC (P) MAC > 8)
L1          3 FE 75-88/MAC AND NI 2-5/MAC AND N >8/MAC
```

Search for iron nickel alloys with a high content of nitrogen ...(2)

L1 ANSWER 1 OF 3 REGISTRY COPYRIGHT 2010 ACS on STN
 RN 1226915-26-9 REGISTRY
 ED Entered STN: 03 Jun 2010
 CN Iron alloy, base, Fe 0-82,Cr 16-33,Nb 1-28,V 0.5-14,N 0.6-10,Mn 0-10,W
 0-10,Co 0-9,Al 0-7,Ti 0-7,Zr 0-7,Mo 0-5,Ni 0-5,C 0-3,Si 0-3,S 0-0.5 (CA
 INDEX NAME)
 MF C . Al . Co . Cr . Fe . Mn . Mo . N . Nb . Ni . S . Si . Ti . V . W . Zr
 CI AYS
 SR CA
 LC STN Files: CA, CAPLUS
 DT.CA CAplus document type: Patent
 RL.P Roles from patents: PROC (Process); PRP (Properties)

Component	Component Percent	Component Registry Number
Fe	0 - 82	7439-89-6
Cr	16 - 33	7440-47-3
Nb	1 - 28	7440-03-1
V	0.5 - 14	7440-62-2
N	0.6 - 10	17778-88-0
Mn	0 - 10	7439-96-5
. . .		
Ti	0 - 7	7440-32-6
Zr	0 - 7	7440-67-7
Mo	0 - 5	7439-98-7
Ni	0 - 5	7440-02-0
. . .		

1 REFERENCES IN FILE CA (1907 TO DATE)
 1 REFERENCES IN FILE CAPLUS (1907 TO DATE)

Search for iron nickel alloys with a high content of nitrogen ...(3)

REFERENCE 1

AN 152:573825 CA
 TI Manufacture of a metal product with a wear-resistant powder-metallurgy steel coating
 IN Sandberg, Odd
 PA Uddeholm Tooling Aktiebolag, Swed.
 SO PCT Int. Appl., 51pp.
 CODEN: PIXXD2
 DT Patent
 LA English
 IPCI B22F0007-04 [I,A]; B22F0007-02 [I,C*]; B22F0003-15 [I,A]; B22F0003-14 [I,C*]
 IPCR B22F0007-02 [I,C]; B22F0007-04 [I,A]; B22F0003-14 [I,C]; B22F0003-15 [I,A]
 CC 55-6 (Ferrous Metals and Alloys)

FAN.CNT 1

	PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
	-----	----	-----	-----	-----
PI	WO 2010053431	A1	20100514	WO 2009-SE51242	20091103
. . .					
	SE 2008050068	A	20100507	SE 2008-50068	20081106
PRAI	SE 2008-50068		20081106		
AB	A wear-resistant powder-metallurgy steel coating 0.05-50 mm thick has the following compn. C 0.01-2.0, Si 0.01-3.0, Mn 0.01-10.0, Cr 16-33, Ni 0-5, Mo + 0.5W 0.01-5.5, Co 0-9, S 0-0.5, N 0.6-10, V + 0.5Nb 0.5-14, Ti 0-7, Zr 0-7, Al 0-7 wt.% and Fe balance. The contents of N on one hand and of				
. . .					
ST	wear resistant powder metallurgy steel coating metal product manuf				

Relative Composition (/RC)

- Alloys may also be searched by relative composition using the Relative Composition (/RC) field, which cites alloy components in order of decreasing abundance.
- For example:

```
=> S AL.TI.FE?/RC
```

could be used to retrieve *steels* where the abundance is due to the order: Al, Ti and Fe.

Combine results from METADEX and CAPLUS

FILE REGISTRY

=> S AL.TI.FE?/RC

L3 576 AL.TI.FE?/RC

FILE HCAPLUS

=> S L3 AND RAPID?(3A)SOLID?

L4 31 L3 AND RAPID?(3A)SOLID?

=> S L4 NOT P/DT

L5 27 L4 NOT P/DT

=> SET DUPORDER FILE

L2 was S AL*TI*FE/ALI AND RAPID?(3A)SOLID?
Search in METADEX!

=> SET DUP REM L2 L5

FILE 'METADEX' ENTERED AT 15:27:52 ON 02 DEC 2010

FILE 'HCAPLUS' ENTERED AT 15:27:52 ON 02 DEC 2010

L6 30 DUP REM L2 L5 (1 DUPLICATE REMOVED)

ANSWERS '1-4' FROM FILE METADEX

ANSWERS '5-30' FROM FILE HCAPLUS

Combine results from METADEX and CAPLUS

=> D ALL 13

L6 ANSWER 13 OF 30 HCAPLUS COPYRIGHT 2010 ACS on STN
AN 2002:763862 HCAPLUS
DN 137:266549
TI Microstructure and thermal stability behavior of a rapidly solidified Al-Ti-Fe-Cr alloy
AU Chen, Yiqing; Cao, Qingping; Su, Yong
CS School of Materials Science and Engineering, Hefei University of Technology, Hefei, 230009, Peop. Rep. China
SO Rare Metals (Beijing, China) (2002), 21(3), 207-212 . . .
PB RM Mini-Computer Publishing Office
DT Journal
LA English
AB A rapidly solidified Al-2.5Ti-2.5Fe-2.5Cr (mass fraction in %) alloy was prepd. by melt spinning. Asquenched and as-annealed microstructures . . .
CC 56-8 (Nonferrous Metals and Alloys)
ST microstructure aluminum alloy rapid solidification; thermal stability aluminum alloy rapid solidification; microhardness aluminum alloy rapid solidification
IT Annealing
Microhardness
Microstructure
Rapid solidification
Thermal stability
(microstructure and thermal stability behavior of rapidly solidified Al-Ti-Fe-Cr alloy)
IT 461640-14-2
RL: PEP (Physical, engineering or chemical process); PRP (Properties); PYP (Physical process); PROC (Process)
(microstructure and thermal stability behavior of rapidly solidified Al-Ti-Fe-Cr alloy). . .

Expand the Compound Identifier (/CI) field:

=> E A/CI

**** START OF FIELD ****

E3	0	--> A/CI
E4	1041977	ALLOY/CI
E5	1041977	AYS/CI
E6	2075435	CCS/CI
E7	31790	CONCEPT/CI
E8	2075435	COORDINATION COMPOUND/CI
E9	31790	CTS/CI
E10	18752	GENERIC REGISTRATION/CI
E11	18752	GRS/CI
E12	276250	IDS/CI

Conclusion

- STN offers a number of Materials databases with bibliographic, patent and numeric content
- Specific STN commands and features allow to precise your search
- Standardization of data allow multi-file searching and duplicate removing
- Unique special content fields are available in STN Materials databases

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