Locating Information on Materials on STN®

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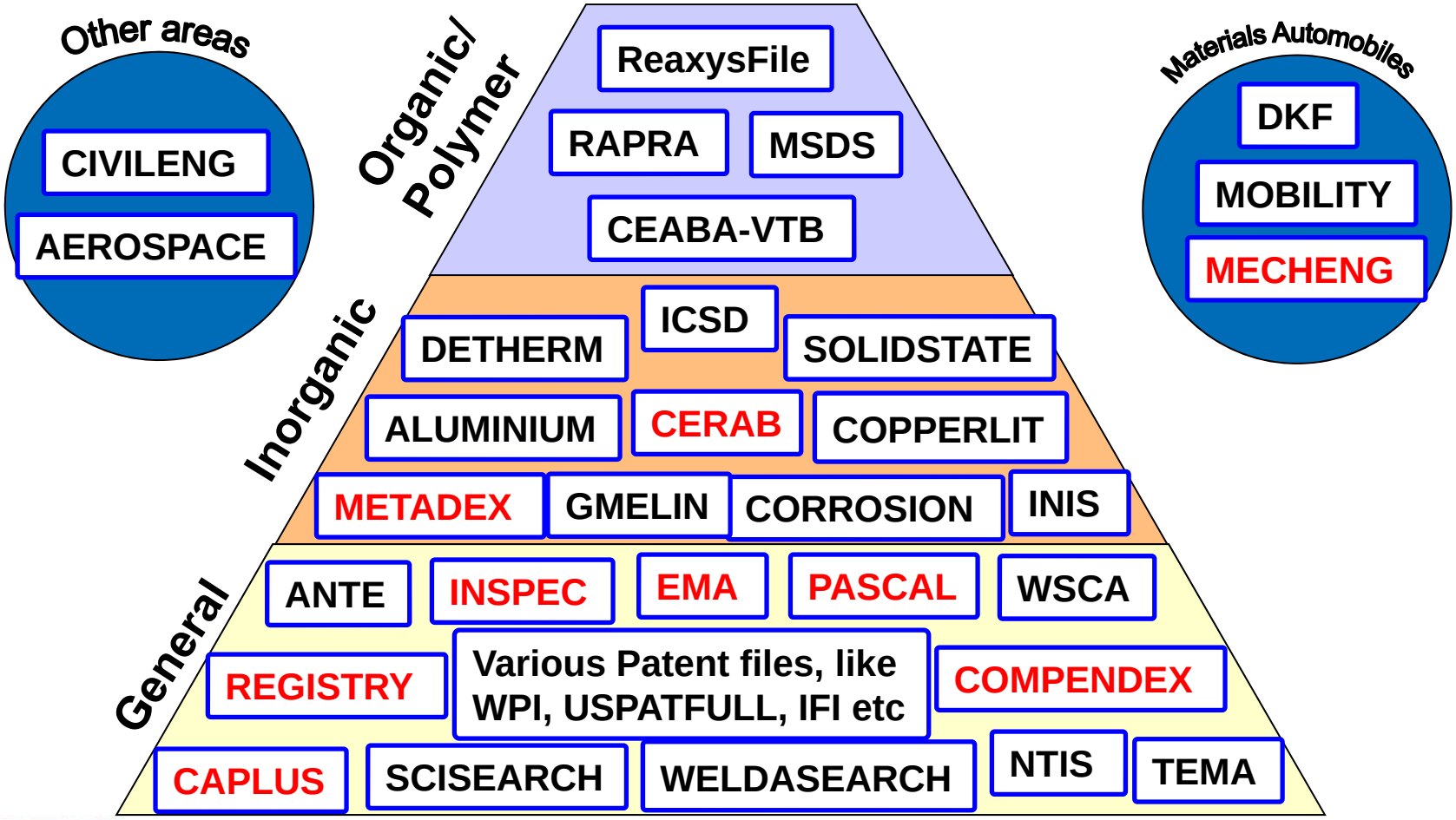
Agenda

In this e-Seminar you will get:

- An Overview on Materials databases available on STN
- Information on specific STN commands and features to refine 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)
  - 93 countries covered
- 1898 to date (file 69INSPEC, 1969 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
  - IPC patent classification

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)

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
- Journals, conference contributions, books, reports, and other non-conventional literature
- Speciality: Alloy Indexing Thesaurus
- Companion files:
  - EMA: Engineering materials
  - MATBUS: Techno-commercial developments in metals and materials

REGISTRY Database

- More than 55 million organic and inorganic substances (Sep. 2010)
- More than 62 million sequences (Sep. 2010)
- 1907 to date
- Alloys described as mixtures of metals with other metals, nonmetals, gases or nometallic 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 / multifile search strategies (INDEX search)
- Use SET commands to refine 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

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,
       MECHENG, METADEX, MSDS-CCOHS, 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

=> S METAL?(A)?CERAMIC?(A)?MATRIX?
L1   QUE METAL?(A)?CERAMIC?(A)?MATRIX?
```

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

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

SET ABB ON = search abbreviation list
SET PLU ON = autom. plural search
SET SPELL ON = autom. supplemented with spelling variants

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           36*  PROMT
F7           30   USPAT2
F8           27   EMA
F9           18   COMPENDEX
F10          13   MECHENG
F11          12   CERAB
F12          11   SCISEARCH
F13          10   ENERGY
F14          10*  ALUMINIUM
F15           7   PASCAL
. . .
=> 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
```

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

Define your own cluster with SET CLUSTER .NAME

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 l29
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: METADEX

Thesauri : EMA,COMPENDEX etc.

Materials Composition: REGISTRY (⇒CAPLUS)

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

Files with Element Terms (/ET)

CERAB	Ceramic Abstracts (1976-)
COMPENDEX	Ei COMPENDEX File (1970-)
EMA	Engineered Materials Abstracts File (1986-)
ENERGY	DOE ENERGY file (1974-)
INIS	International Nuclear Information System (1970-)
INSPEC	The Database for Physics, Electronics and Computing (1969-)
INSPHYS	INSPEC- PHYS Supplement Backfile (1979 - 1994)
MATBUS	Materials Business File (1983-)
METADEX	Metals Abstracts/Alloy Index (1966-)

Chemical Indexing (/CHI) in INSPEC

- 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
oooo
=> E E3+ALL
E13       1192    BT2  materials/CT
E14      83476     BT1  nanostructured mat
E15      14491      -->  nanowires/CT
                     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
```

/CT Controlled terms: best way for finding relevant records

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

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

/CHI Chemical Indexing, only available in INSPEC

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

=> 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
```

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

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

=> 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

=> S L4 OR L5
L7           54 L4 OR L5
```

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

Comparison results of /BI with /CT

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

=> 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
```

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

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 l0CrNiMoV 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?

=> 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
```

AL*TI*FE only searchable, not displayable!

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 specífied 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      Component
             Percent    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

=> 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
```

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

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 refine your search
- Standardization of data allow multi-file searching and duplicate removing
- Unique special content fields are available in STN Materials databases

For more information …

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www.cas.org

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