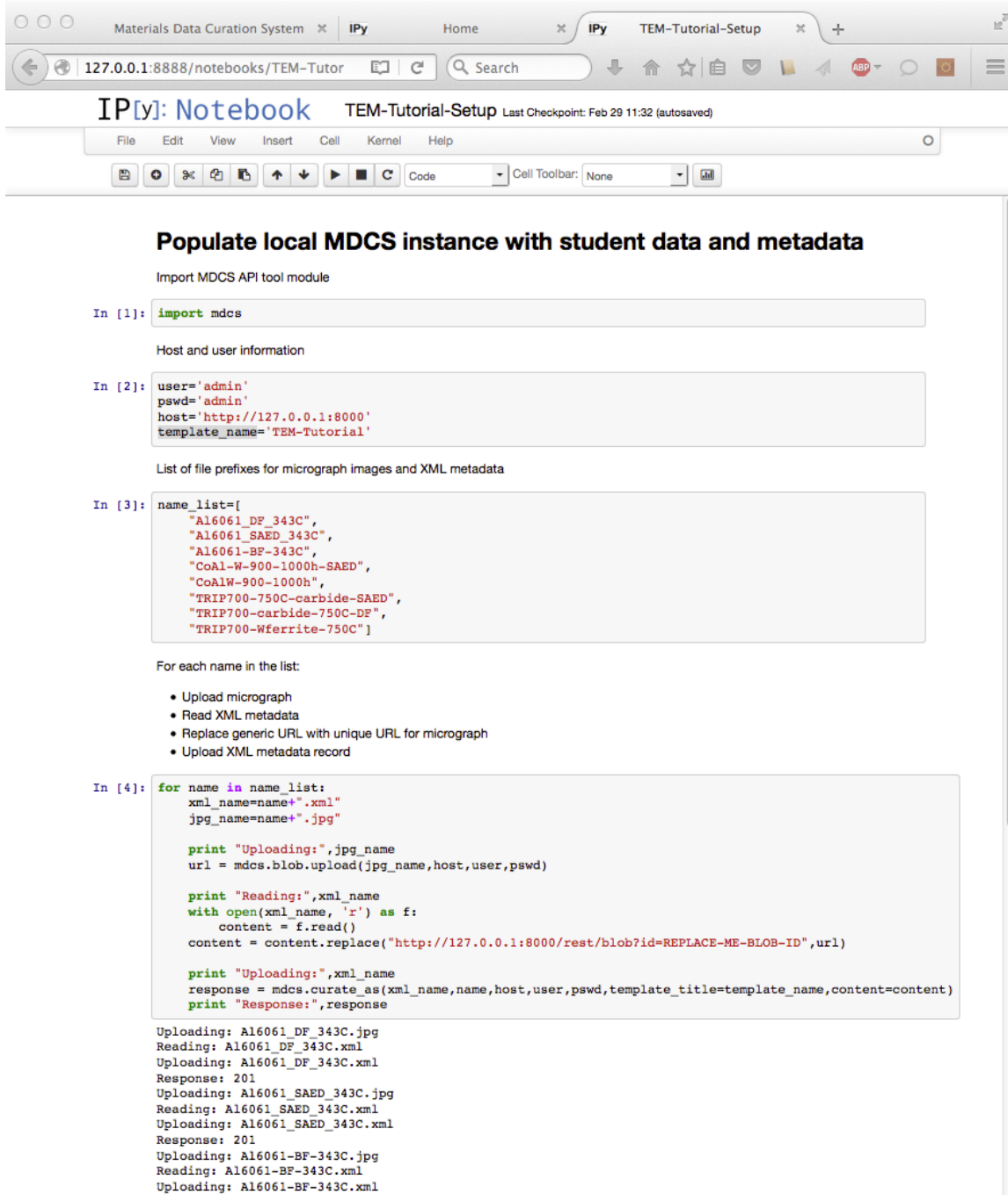


# Data Exploration: Simple TEM Tutorial

## Upload past student data

To synthesize student usage in the past, execute the IPython (Jupyter) Notebook “TEM-Tutorial-Setup”:



```
IP[y]: Notebook TEM-Tutorial-Setup Last Checkpoint: Feb 29 11:32 (autosaved)
File Edit View Insert Cell Kernel Help
[Icons] Cell Toolbar: None [Icon]

Populate local MDCS instance with student data and metadata

Import MDCS API tool module

In [1]: import mdcs

Host and user information

In [2]: user='admin'
pswd='admin'
host='http://127.0.0.1:8000'
template_name='TEM-Tutorial'

List of file prefixes for micrograph images and XML metadata

In [3]: name_list=[
    "Al6061_DF_343C",
    "Al6061_SAE3_343C",
    "Al6061-BF-343C",
    "CoAl-W-900-1000h-SAE3",
    "CoAlW-900-1000h",
    "TRIP700-750C-carbide-SAE3",
    "TRIP700-carbide-750C-DF",
    "TRIP700-Wferrite-750C"]

For each name in the list:
• Upload micrograph
• Read XML metadata
• Replace generic URL with unique URL for micrograph
• Upload XML metadata record

In [4]: for name in name_list:
    xml_name=name+".xml"
    jpg_name=name+".jpg"

    print "Uploading:",jpg_name
    url = mdcs.blob.upload(jpg_name,host,user,pswd)

    print "Reading:",xml_name
    with open(xml_name, 'r') as f:
        content = f.read()
        content = content.replace("http://127.0.0.1:8000/rest/blob?id=REPLACE-ME-BLOB-ID",url)

    print "Uploading:",xml_name
    response = mdcs.curate_as(xml_name,name,host,user,pswd,template_title=template_name,content=content)
    print "Response:",response

Uploading: Al6061_DF_343C.jpg
Reading: Al6061_DF_343C.xml
Uploading: Al6061_DF_343C.xml
Response: 201
Uploading: Al6061_SAE3_343C.jpg
Reading: Al6061_SAE3_343C.xml
Uploading: Al6061_SAE3_343C.xml
Response: 201
Uploading: Al6061-BF-343C.jpg
Reading: Al6061-BF-343C.xml
Uploading: Al6061-BF-343C.xml
```

## Explore Student TEM Data by Student Name

1: From the MDCS homepage, click on “Data Exploration” then click on “Search by Keyword”:

The screenshot shows the Materials Data Curation System (MDCS) interface. The browser address bar displays '127.0.0.1:8000/explore/'. The page title is 'Materials Data Curation System' with a welcome message 'Welcome, admin. Thanks for logging in.' and links for 'Logout', 'My Profile', and 'Help'.

The main navigation bar includes 'Home', 'Data Curation', 'Data Exploration', and 'Composer'. The 'Data Exploration' link is highlighted with a red circle. Below this, the 'Search by Keyword' link is also highlighted with a red circle.

The 'Select Template' page is displayed, featuring a sidebar with three steps: 1. Select Template, 2. Select Fields, and 3. Perform Search. The main content area is titled 'Select Template' and includes instructions: 'Select a template from the following table. Once you make your selection, click on "Select Fields" to proceed. It will automatically load the appropriate form and display it on the next page.'

The 'Global Templates' section contains a table with the following data:

Template name	File name	Actions
TEM-Tutorial	workshop-TEM.xsd	Current template

The 'User Defined Templates' section includes the text: 'Create your own templates using the [Composer](#) and you will be able to use them from this section.'

The footer contains the copyright notice '© 2012 - 2016 Materials Data Curation System | Privacy Policy | Terms of Use | Administration' and the text 'Website template by Arcsin'.

2: Search for all records under student name “Smith”:

The screenshot shows a web browser window with the address bar displaying "127.0.0.1:8000/explore/keyword". The page title is "Materials Data Curation System" with a subtitle "Welcome, admin. Thanks for logging in." The navigation bar includes links for "Home", "Data Curation", "Data Exploration", and "Composer". The "Data Exploration" section is active, showing "Query by Example" and "Search by Keyword" tabs. The "Search by keyword" tab is selected, displaying a search input field with the text "Smith" and a search button. Below the search field, there are two results listed:

- ☐ [CoAlW-900-1000h](#) TEM-Tutorial
- ☐ [CoAl-W-900-1000h-SAED](#) TEM-Tutorial

The footer of the page contains copyright information: "© 2012 - 2016 Materials Data Curation System | Privacy Policy | Terms of Use | Administration" and a link to "Website template by Arcsin".

### 3: Expand “CoAlW-900-1000h”:

The screenshot shows a web browser window with the address bar displaying "127.0.0.1:8000/explore/keyword". The page title is "Materials Data Curation System" with a subtitle "Welcome, admin. Thanks for logging in." and navigation links for "Logout", "My Profile", and "Help". The main navigation bar includes "Home", "Data Curation", "Data Exploration", and "Composer". The "Data Exploration" section is active, showing "Query by Example" and "Search by Keyword".

On the left, the "Current template" section shows a checked box for "TEM-Tutorial". The main content area is titled "Search by keyword" and features a search input field containing "Smith" with a magnifying glass icon and an "Export" button. Below the search bar, it indicates "2 results".

The first result is "CoAlW-900-1000h" with a "TEM-Tutorial" icon and a red "X" icon. It is categorized under "measurement" and expanded to show a hierarchical structure:

- core**
  - title : TEM Measurement of Co-11W-9.4Al
  - contactPoint**
    - fn : John Smith
    - hasEmail : data@nist.gov
  - keyword : TEM
- material**
  - quantity-unit : mole percent
  - composition**
    - constituent**
      - element : Co
      - quantity : 79.6
      - purity : 1
      - error : 0
    - constituent**
      - element : W
      - quantity : 11
      - purity : 1

4: Scroll to bottom of metadata record, highlight the download URL of supporting file, right-click and select “Open Link”:

The screenshot displays the Materials Data Curation System interface. The browser address bar shows the URL `127.0.0.1:8000/explore/keyword`. The main content area shows a metadata record for **CoAlW-900-1000h**. The metadata is organized into a tree view on the left, with fields such as **element**, **quantity**, **purity**, **error**, **constituent**, **phases**, **anneal**, **time**, **temperature**, **transmission-electron-microscopy**, **instrument-ID**, **imaging-mode**, **accelerating-voltage**, and **supporting-files**. The **supporting-files** section shows a file named **CoAlW-900-1000h-SAED TEM-Tutorial** with a download URL: `http://127.0.0.1:8000/rest/blobs?id=56d472911813cd10fb6e6b04`. A preview of the SAED image is shown in the top right. A Firefox dialog box is open, asking the user to open the file with Preview (default) or save it. The dialog box text includes: "You have chosen to open: CoAlW-900-1000h.jpg which is: Preview.app Document from: http://127.0.0.1:8000 What should Firefox do with this file? Open with Preview (default) Save File Do this automatically for files like this from now on. Cancel OK".

# Explore all TEM records containing Silicon and narrow by Bright Field

## 1: Search by keyword “Si”

The screenshot shows a web browser window with the URL `127.0.0.1:8000/explore/keyword`. The page title is "Materials Data Curation System" with a welcome message for "admin". The navigation bar includes "Home", "Data Curation", "Data Exploration", and "Composer". The "Data Exploration" section is active, showing "Query by Example" and "Search by Keyword". The "Current template" section on the left has "TEM-Tutorial" selected. The main content area is titled "Search by keyword" and shows a search bar with the input "Si". An "Export" button is visible. Below the search bar, there are 6 results listed, each with a checkbox, a link to a TEM-Tutorial, and a red 'X' icon. The results are:

- ☐ [TRIP700-Wferrite-750C](#) TEM-Tutorial
- ☐ [TRIP700-carbide-750C-DF](#) TEM-Tutorial
- ☐ [TRIP700-750C-carbide-SAED](#) TEM-Tutorial
- ☐ [Al6061-BF-343C](#) TEM-Tutorial
- ☐ [Al6061 SAED 343C](#) TEM-Tutorial
- ☐ [Al6061 DF 343C](#) TEM-Tutorial

The footer contains navigation links: "Home", "Data Curation", "Data Exploration", "Composer", and "Contact". It also includes copyright information: "© 2012 - 2016 Materials Data Curation System | Privacy Policy | Terms of Use | Administration" and a note: "Website template by Arcsin".

## 2: Add keyword of “bright field”

The screenshot shows a web browser window with the address bar displaying `127.0.0.1:8000/explore/keyword`. The page title is "Materials Data Curation System" and the user is logged in as "admin". The navigation bar includes links for Home, Data Curation, Data Exploration, and Composer. The "Data Exploration" section is active, showing "Query by Example" and "Search by Keyword" options. The "Search by keyword" section displays a search bar with the query "si" and "bright field". Below the search bar, there are two results:

- ☐ [TRIP700-Wferrite-750C](#) TEM-Tutorial
- ☐ [Al6061-BF-343C](#) TEM-Tutorial

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### 3: Expand “TRIP700-Wferrite-750C” and download micrograph

The screenshot displays the Materials Data Curation System interface. The main content area shows a hierarchical tree of data for the entry "TRIP700-Wferrite-750C". The tree structure is as follows:

- quantity : 0.007
- purity : 1
- error : 0.0001
- constituent
  - element : N
  - quantity : 0.0053
  - purity : 1
  - error : 0.0001
- phases : Widmanstätten
- anneal
  - time
    - value : 4
    - value : 4
    - value : 2
    - value : 2
    - unit : h
  - temperature
    - value : 350
    - value : 500
    - value : 600
    - value : 750
    - unit : C
- transmission-electron-microscopy
  - instrument-ID : FEI-Titan
  - imaging-mode : Bright Field
  - accelerating-voltage
    - value : 300
    - unit : kV
  - supporting-files
    - file
      - downloadURL : <http://127.0.0.1:8000/rest/blob?id=56d472921813cd10fb16eb0d>

A micrograph is displayed in a separate window titled "TRIP700-Wferrite-750C.jpg". The micrograph shows a dark, textured surface with some lighter, irregular shapes.

A dialog box is open asking "What should Firefox do with this file?". The options are:

- ☒ Open with Preview (default)
- ☐ Save File
- ☐ Do this automatically for files like this from now on.

The footer contains navigation links: Home | Data Curation | Data Exploration | Composer | Contact. It also includes copyright information: © 2012 - 2016 Materials Data Curation System | Privacy Policy | Terms of Use | Administration. The website template is by Arcsin.