

# NAN⊙MATERIALREGISTRY

Kimberly Guzan and Karmann Mills  
RTI International

# NANOMATERIALREGISTRY

*Comprehensively  
curated, validated  
data on a scale  
suitable for  
decision making*

Web Address:  
**www.nanomaterialregistry.org**

Funded by:



## WELCOME TO THE NANOMATERIAL REGISTRY!

The Nanomaterial Registry is a one-stop, authoritative, fully curated resource that provides information on the biological and environmental implications of well-characterized nanomaterials. The Nanomaterial Registry is being built through strong collaborations with broad stakeholder groups that represent the diverse nanomaterial community, including industry, regulatory institutions, government, and academia. [LEARN MORE ABOUT OUR VISION](#) [WHAT IS CURATED DATA?](#)

Nanomaterial Registry

Minimal Information  
Standards

Compliance Levels

Instance of  
Characterization

Matching & Similarity

Comparison

### BROWSE NANOMATERIALS



Material Type



Size



Shape



Surface Area

### A TOOL FOR THE NANOMATERIAL COMMUNITY

An authoritative website that compiles data from multiple databases into a single resource, the Nanomaterial Registry (NR) provides tools for analyzing and comparing data on the biological and environmental implications of well-characterized nanomaterials. This resource will evolve as the quality and quantity of the information on nanomaterials improve. Hundreds of nanomaterial entries have been curated into the NR for physico-chemical characteristics and are available to the public. Biological and environmental study data for existing nanomaterial entries will also be curated into the NR.

To access this information, search or browse the database using the buttons on this home page. From a query results table, you can request

### LATEST NEWS

**June 2012** - The Greener Nano 2012: Nanoinformatics Tools and Resources Workshop, will be held in Portland, OR, July 30<sup>th</sup>...  
[Read more](#)

**May 2012** - The U.S. Government Accountability Office has released a report, "Nanomaterials: A Review of the Federal Government's Role in the Development of a National Nanomaterials Registry..."



# Federal Initiatives

*The NNI Coordinates R&D in nanoscale science, engineering, and technology*

“NNI recognizes the **potential of nanomaterials** to

- collect and store energy
- reinforce materials
- sense contaminants
- enable life-saving drugs
- shrink and accelerate computational device”



NNI

## National Nanotechnology Initiative

- An interagency effort that was launched in 2001
- 25 Federal agencies
- Informs and influences the Federal budget for Nanotechnology R&D

NKI

## Nanotechnology Knowledge Infrastructure

- NNI Signature Initiative for sustainable design of nanomaterials
- NKI THRUST 4: robust digital nanotechnology data and information infrastructure to support effective data sharing, collaboration, and innovation across disciplines and applications

NIH

## Nanomaterial Registry

- NIH funded project
- Web-based Registry of characterizations and biomedical and environmental applications of nanomaterials
- Launched in 2012, led by RTI International

[http://nano.gov/sites/default/files/pub\\_resource/nki\\_nsi\\_white\\_paper\\_-\\_final\\_for\\_web.pdf](http://nano.gov/sites/default/files/pub_resource/nki_nsi_white_paper_-_final_for_web.pdf)

NANOMATERIALREGISTRY

# NANOMATERIAL REGISTRY MISSION

## ★ Create a central authoritative data source for the nanomaterial community

- ✓ Integrate data from multiple public data sources
- ✓ Access the data
- ✓ Facilitate improvement in data quality
- ✓ Facilitate development of new models
- ✓ Engage the community

## ★ Target User Groups

- ✓ Nanomaterial researchers who generate or analyze data for biological, medical, or environmental implications and applications
- ✓ SME's who make research decisions/guide research
- ✓ Groups that want to share data globally

# Challenges

- Archiving **BROAD** data into a single integrated repository (scope, application of data)
- Developing an **EFFICIENT** data curation process and tools
- **SHARING** the data in a effective way
- Staying **CURRENT** with relevant information and standards

# The Approach

## 1. Define a scope - The Domain of the Registry

- ✓ nanoparticles, materials with nano-features, nano-enabled products, and nano-formulations
- ✓ Physico-chemical characteristics
- ✓ Data that describes how these materials interact in environmental (air, water, soil) or biological (in vitro, in vivo, in silico) systems

## 2. Identify the relevant information

## 3. Develop a process for systematic data archiving

## 4. Evaluate information in a systematic way

## 5. Disseminate the information

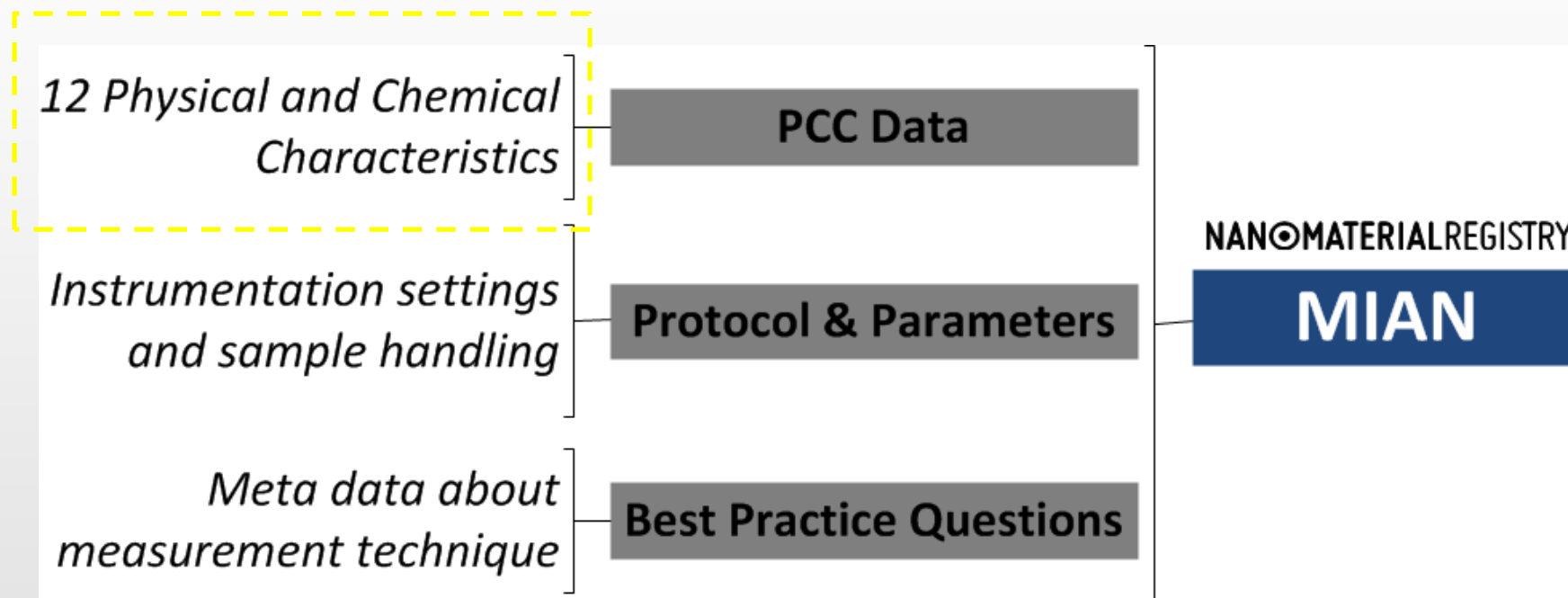
## 6. Hands on analysis

Data for decision making

# **IDENTIFYING RELEVANT INFORMATION**

# Relevant Information

Minimal Information About Nanomaterials for Physico-Chemical Characteristics



A **controlled vocabulary** of PCC & measurands have been identified (<https://www.nanomaterialregistry.com/resources/Glossary.aspx>)



# Relevant Information

Minimal Information About Nanomaterials for Physico-Chemical Characteristics

## 12 Physical and Chemical Characteristics (“PCC MIAN”)



Composition



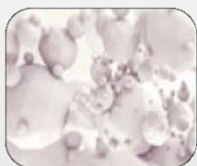
Size



Size  
Distribution



Shape



Aggregation/  
Agglomeration State



Surface Area



Surface Charge



Surface  
Chemistry



Surface Reactivity



Purity



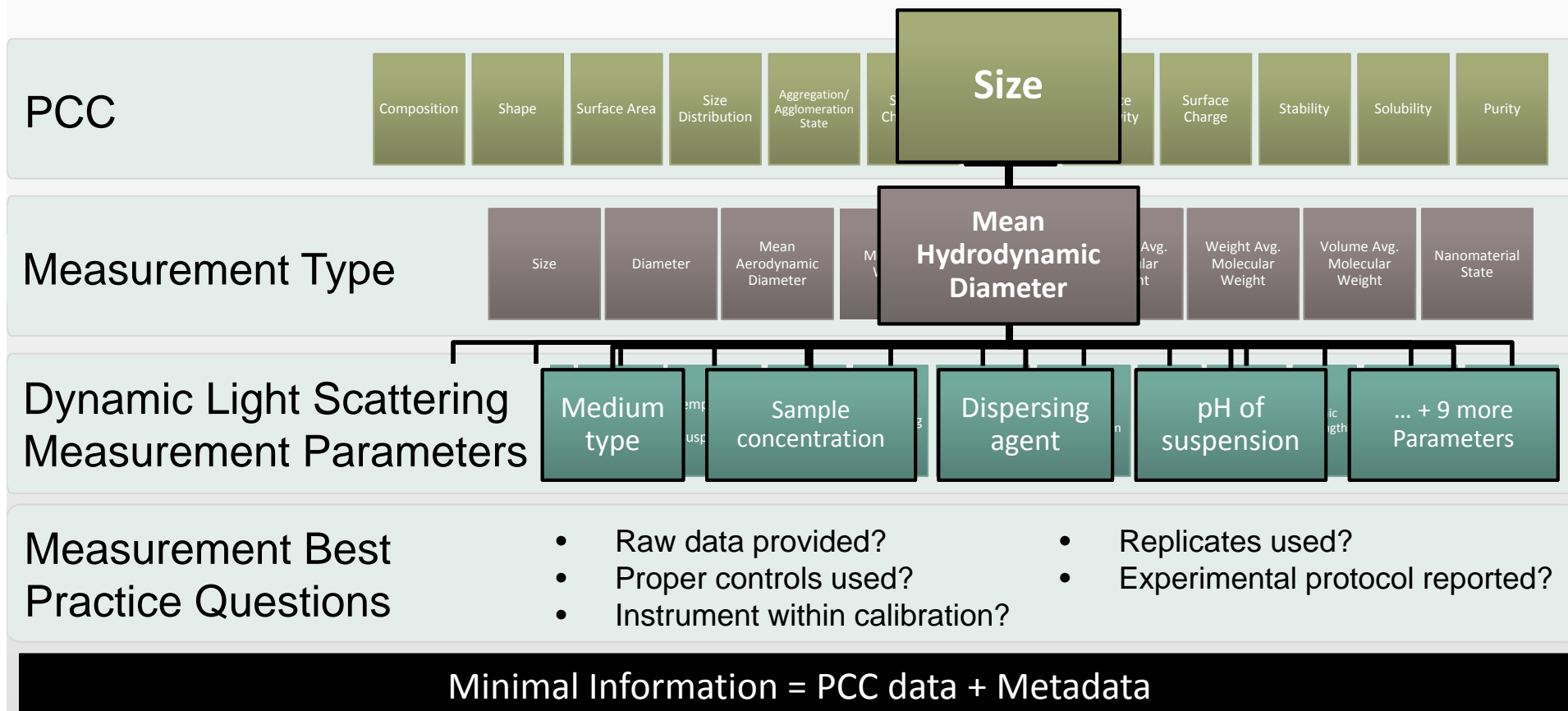
Solubility



Stability

# Relevant Information

Minimal Information About Nanomaterials for Physico-Chemical Characteristics



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# Relevant Information

Minimal Information About Nanomaterials for Physico-Chemical Characteristics

NR963

NR Descriptor: Au NP  
Information for this nanomaterial was curated from National Institute of Standards and Technology  
Original Publication(s): Not reported  
Information reported: PCC Characterization? Yes Environmental Interactions? No

CURATED DATA BASED ON INSTANCE OF CHARACTERIZATION

AS RECEIVED  
AS PROCESSED A  
AS PROCESSED B  
make a comment

AS RECEIVED

Nanomaterial State: liquid suspension  
Manufacturer: National Institute of Standards & Technology  
Product Name: Reference Material 8011  
Synthesis Method: citrate reduction

PHYSICO-CHEMICAL CHARACTERISTICS BIOLOGICAL INTERACTIONS ENVIRONMENTAL INTERACTIONS

Particle Size

Mean Hydrodynamic Diameter: 13.5 nm +/- 0.1 nm  
Dynamic Light Scattering

Mean Hydrodynamic Diameter: 9.1 nm +/- 1.8 nm  
Small Angle X-Ray Scattering

Mean Hydrodynamic Diameter: graphically represented  
Intensity Weighted: Field Flow Fractionation

Composition OVERALL NANOMATERIAL

COATING

CORE

Molecular Identity: UV-Visible Spectroscopy  
Lambda Max: 517 nm

## Best Practice Questions

### BEST PRACTICES

**Instrument Manufacturer:** Malvern  
**Instrument Model:** Zetasizer Nano ZS  
**Raw Data Provided:** Not reported  
**Proper Controls Used:** Not reported  
**Instrument within Calibration:** Yes  
**Number of Replicates:** 40  
**Protocol Reported:** Not reported  
**Protocol Citation:** ISO 13321:1996(E)  
**Protocol Modifications:** Not Reported

## Measurement Parameters

### PROTOCOL & PARAMETERS

**Temperature of Suspension:** 20 +/- 0.1 C  
**Algorithm Used:** cumulants  
**Viscosity:** 1.0031 mPa\*s  
**Solvent/Medium Type:** water  
**Dispersing Agent:** NaCl  
**Concentration of Dispersing Agent:** 2 mM  
**Sample Concentration:** diluted 6-fold  
**Sonication/Milling Power:** none  
**Sonication/Milling Time:** none

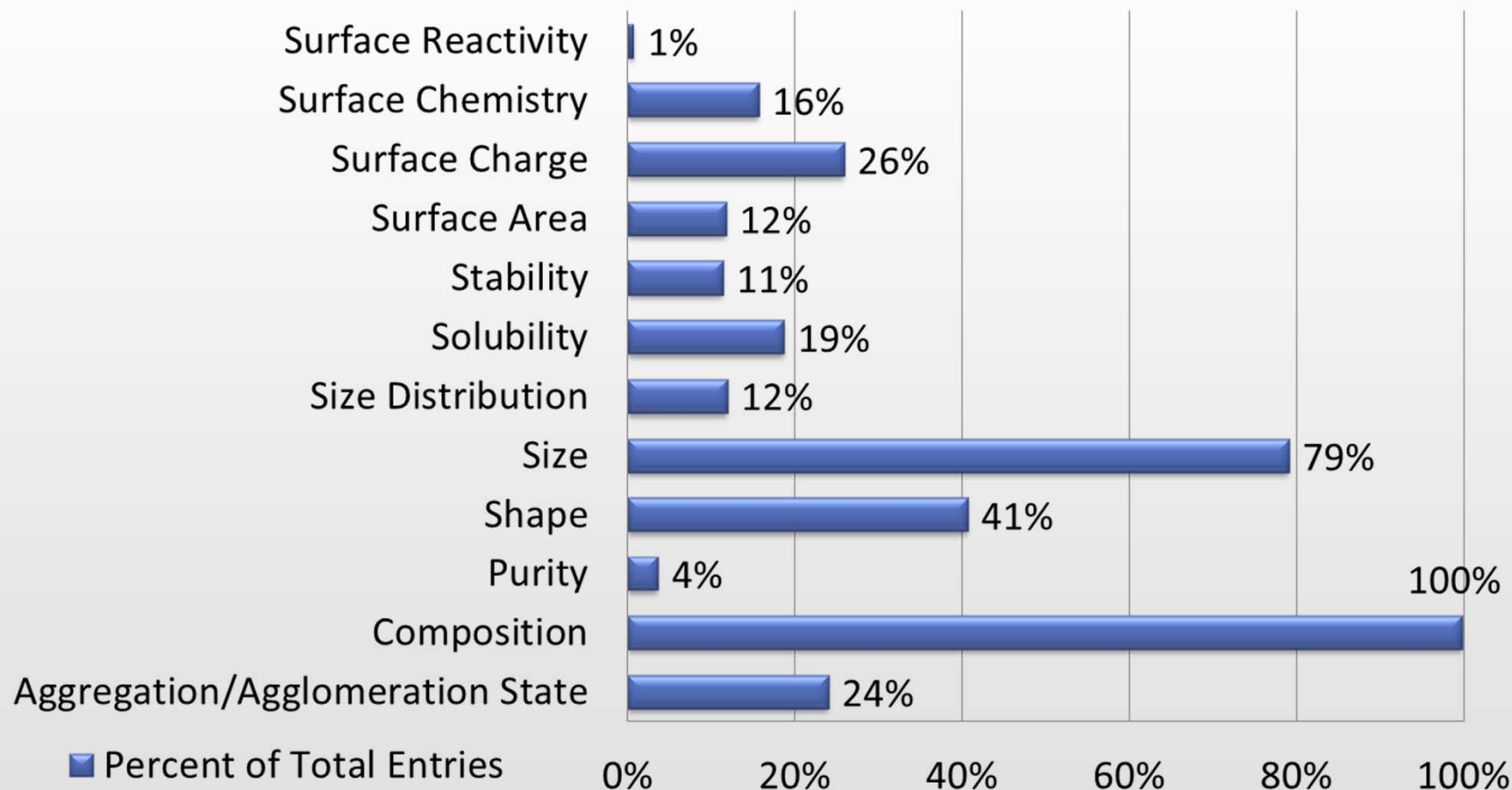
NIST Reference Material 8011 – Citrate stabilized Au NP

NANOMATERIALREGISTRY

# Relevant Information

Minimal Information About Nanomaterials for Physico-Chemical Characteristics

## Current Characterization Profile for NR Records

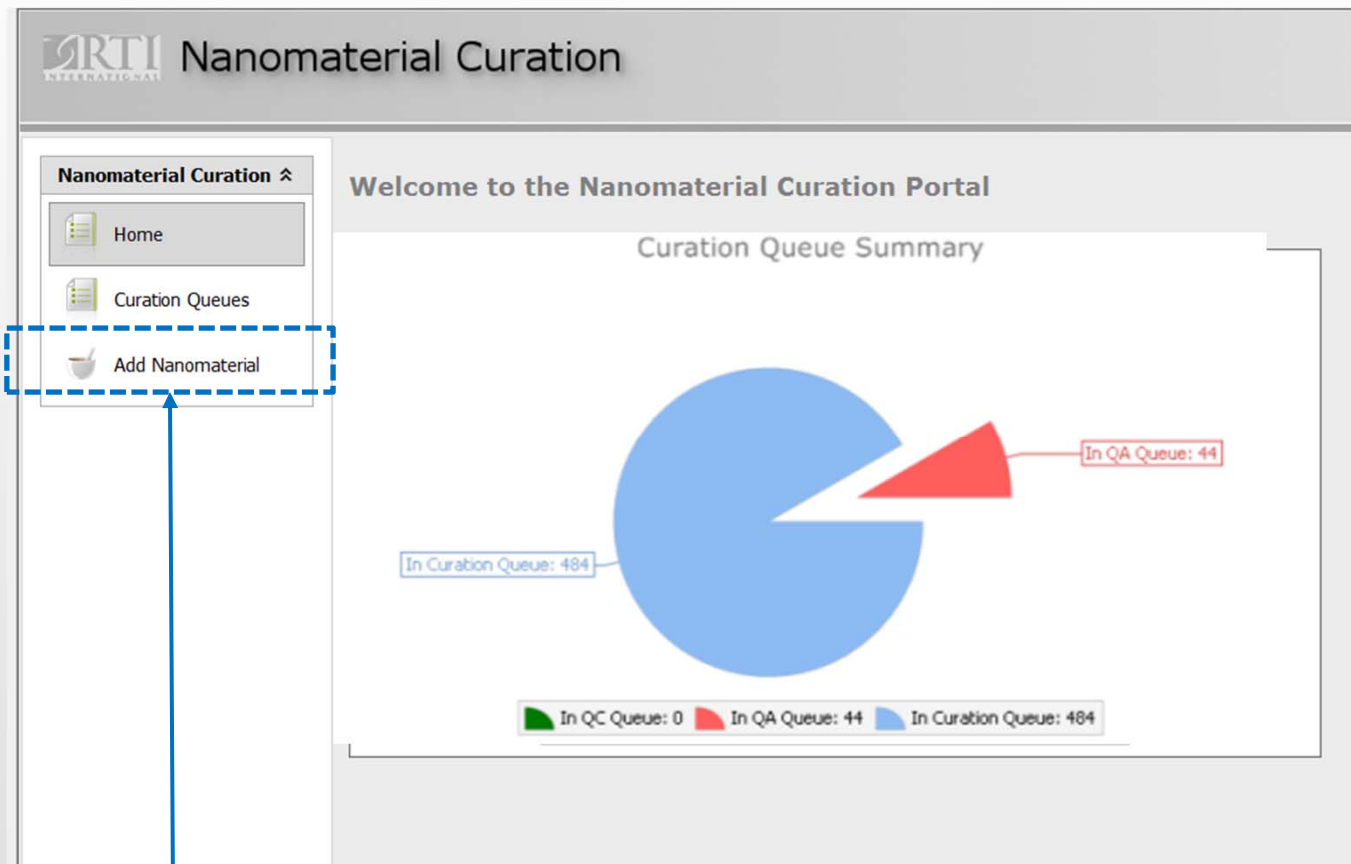


Data for decision making

# **A PROCESS FOR SYSTEMATIC DATA ARCHIVING**

# Systematic Data Archiving

A **DATA CURATION TOOL** facilitates the progression of nanomaterial entries through the curation process to the Nanomaterial Registry website



## DATA ENTRY

- ✓ identifies, evaluates, and enters data

## QUALITY ASSURANCE

- ✓ check for transcription errors

## QUALITY CONTROL

- ✓ correct any errors or inconsistencies in the scientific interpretation

★ Curation tool workflow starts with the creation of a nanomaterial record

# Systematic Data Archiving:

## ***DATA CURATION TOOL***

Data records are promoted through **QUEUES**

Nanomaterials In Curation Queue

Queue: **Curation**

NRID	DB Entry Name	Status	AssignedTo	Date Created	Date Update			
<a href="#">NR1002</a>	NEU-LWangJNBT2008-01	In Curation Queue	pdurham	1/3/2013	4/17/2013			
<a href="#">NR1036</a>	Muti-Wall CNT	In Curation Queue	jchild	1/31/2013	1/31/2013			
<a href="#">NR1246</a>	NRCWE_UCFV_HC_UC_SST-NJacobsenEMM2008-01	In Curation Queue	jchild	4/29/2013	4/30/2013			
<a href="#">NR1250</a>	JHU_KSU-JGallowayNNBM2012-01	In Curation Queue	pdurham	4/30/2013	4/30/2013			
<a href="#">NR1251</a>	NRCWE_UCFV_HC_UC_SST-NJacobsenEMM2008-02	In Curation Queue	jchild	4/30/2013	4/30/2013			
<a href="#">NR1253</a>	JHU_KSU-JGallowayNNBM2012-03	In Curation Queue	pdurham	4/30/2013	4/30/2013			

Dropdown menu options: In Queue, Assigned to Me, **Curation**, QA, QC, Curated and Released

Row actions: Edit, Assign, Delete

**SEARCH** and **SORT** options for data in queues

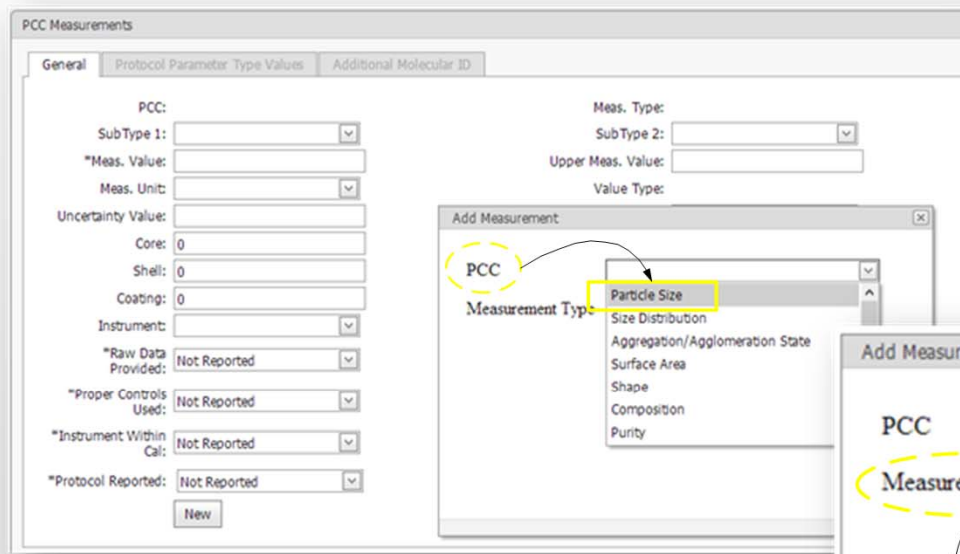
NANOMATERIALREGISTRY

**UPDATE** information or change the status of a data record

# Systematic Data Archiving:

## ***DATA CURATION TOOL***

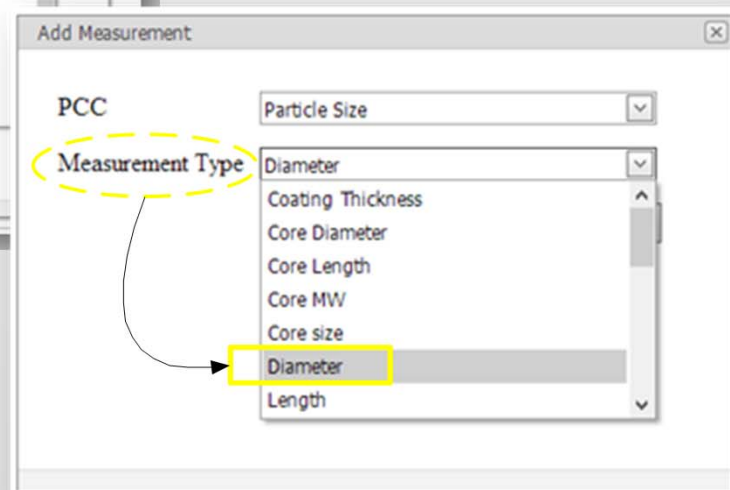
- ✓ **STEP 1: PCC** “Particle Size” is selected from a list of the 12 MIAN PCCs



The screenshot shows the 'PCC Measurements' form with the 'General' tab selected. The 'PCC' dropdown is highlighted with a yellow circle, and the 'Particle Size' option is highlighted in the dropdown list. The 'Measurement Type' dropdown is also highlighted with a yellow circle.

### An example of SMART CURATION:

- ✓ Drop downs in data entry fields are populated with selection lists that are valid according to the fields already entered



The screenshot shows the 'Add Measurement' dialog box. The 'PCC' dropdown is highlighted with a yellow circle, and the 'Measurement Type' dropdown is highlighted with a yellow circle. The 'Measurement Type' dropdown list is open, showing options like 'Diameter', 'Coating Thickness', 'Core Diameter', 'Core Length', 'Core MW', 'Core size', 'Diameter', and 'Length'. The 'Diameter' option is highlighted in the list.

- ✓ **STEP 2: Measurement Type** drop down is populated with options relevant to “Particle Size”



# Systematic Data Archiving: *DATA CURATION TOOL*

## An example of SMART CURATION:

- ✓ **STEP 1: MEASUREMENT** technique is selected from a list of options relevant to “particle size”
- ✓ **STEP 2: PROTOCOL** tab is populated with options relevant to “Dynamic Light Scattering”

**✓ STEP 2**

PCC Measurements

General **Protocol Parameter Type Values** Additional Molecular ID

PCC: Particle Size

SubType 1:

\*Meas. Value:

Meas. Unit:

Uncertainty Value:

Core:

Shell:

Coating:

\*Raw Data Provided:

\*Proper Controls Used:

\*Instrument Within Cal:

**✓ STEP 1**

Meas. Type: Mean Diameter

SubType 2:

Upper Meas. Value:

Value Type: Free Text

Uncertainty Unit:

ComponentID:

Technique:

Instrument:

\*# of Replicates:

\*Standard Pub. Citation:

\*Modification Desc:

**Protocol Parameter Type Values**

*Protocol	*Value	Unit	#
Temperature of Suspension	20	C	<a href="#">Edit</a> <a href="#">New</a> <a href="#">Delete</a>
Sonication/Milling Time	0	minutes	<a href="#">Edit</a> <a href="#">New</a> <a href="#">Delete</a>

**Protocol Parameter Type Values**

*Protocol	*Value	Unit	#
Temperature of Suspension			<a href="#">Update</a> <a href="#">Cancel</a>
Algorithm Used			<a href="#">Edit</a> <a href="#">New</a> <a href="#">Delete</a>
Viscosity			<a href="#">Edit</a> <a href="#">New</a> <a href="#">Delete</a>
pH of Suspension			
Temperature of Suspension			
Dispersing Agent			
Purity of Dispersing Agent			
PCC Measure Concentration of Dispersing Agent			

# Systematic Data Archiving: **DATA CURATION TOOL**

## Preview Data Tool

Step 1: Enter General Nanomaterial Information

General Original Research Publications

\*DB Name: National Institute of Standards and Tec NRID: NR963

\*DB Entry Name: Reference Material 8011 \*NR Descriptor: Au NP

\*Data Source ID: RM 8011 \*DB Entry URL

\*Status: In Nanomaterial Registry

The curation team can use the PREVIEW tool to quickly see how the data will display on the website

**NANOMATERIALREGISTRY**

ABOUT THE REGISTRY RESOURCES CONTACT US DATABASE SEARCH

NR963

NR Descriptor: Au NP  
Information for this nanomaterial was curated from National Institute of Standards and Technology  
Original Publication(s): Not reported  
Information reported: POC Characterization? Yes Environmental Interactions? No Biological Interactions? No

CURATED DATA BASED ON INSTANCE OF CHARACTERIZATION Find similar nanomaterials

AS RECEIVED

Nanomaterial State: liquid suspension  
Manufacturer: BB International of Cardiff, UK  
Product Name: Reference Material 8011  
Laboratory: National Institute of Standards and Technology (NIST)  
Synthesis Method: citrate reduction

PHYSICO-CHEMICAL CHARACTERISTICS BIOLOGICAL INTERACTIONS ENVIRONMENTAL INTERACTIONS

Particle Size

Mean Hydrodynamic Diameter: 12.5 nm +/- 0.1 nm  
Dynamic Light Scattering

Mean Hydrodynamic Diameter: 9.1 nm +/- 1.8 nm  
Small Angle X-Ray Scattering

Mean Hydrodynamic Diameter: graphically represented  
Intensity Weighted Field Flow Fractionation

Composition OVERALL NANOMATERIAL

Molecular Identity: UV-Visible Spectroscopy  
Lamda Max: 517 nm

NANOMATERIALREGISTRY





Data for decision making

# **EVALUATING THE INFORMATION**

# Evaluating the Information

## Compliance Level

The Nanomaterial Registry's **COMPLIANCE LEVEL FEATURE** provides a **METRIC** on the **QUALITY** of characterization of a nanomaterial entry

Compliance Level	Score	Medal
Gold	76-100	
Silver	51-75	
Bronze	26-50	
Merit	0-25	

**COMPLIANCE LEVELS** are broken into **MERIT**, **BRONZE**, **SILVER**, and **GOLD** and represent increasing quality of characterization based on our evaluation criteria

$$CL_{IPCC} = \sum_{i=1}^M \frac{W_i}{(M * N)}$$

**A COMPLIANCE LEVEL SCORE** is a quantitative value calculated by assigning a weight (W) to each value reported in the curated entry (M)

# Evaluating the Information

## Compliance Level

### COMPLIANCE LEVEL WEIGHTING FACTOR IS HIGHER WHEN:

- Terms with **greater specificity** are used
- **Well-established techniques** are used
- **Protocols are adequately described**
- **Standard protocols** are used
- Values are measured with **multiple techniques**
- **Good laboratory practices** are reported

*Example: Particle Size reported as*

- Diameter
- **Mean aerodynamic diameter**





$$CL_{IPCC} = \sum_{i=1}^M \frac{W_i}{(M * N)}$$

*Example:*

- Instruments within calibration and proper controls were used
- replicate measurements were taken

# Evaluating the Information

## Compliance Level

	 MERIT	 BRONZE	 SILVER	 GOLD
<b>Particle Size</b> 37.5 nm	✓	✓	✓	✓
<b>Reported as</b> Mean Hydrodynamic Diameter		✓	✓	✓
<b>Technique</b> Dynamic Light Scattering			✓	✓
<b>Instrument</b> Malvern Zeta Sizer Nano ZS			✓	✓
<b>Measurement parameters</b> 11 out of 12 reported				✓
<b>Protocol</b> ASTM E2490-09				✓

**COMPLIANCE LEVEL**  
is higher when more  
Meta-data about a  
characterization are  
reported

# Evaluating the Information

## Compliance Level on the Registry

COMPLIANCE LEVEL for individual characterizations are displayed

COMPLIANCE LEVELS													
★ Gold		★ Silver		★ Bronze		★ Merit							
PCC COMPLIANCE		PARTICLE SIZE		SIZE DISTRIBUTION		AGGREGATION / AGGLOMERATION STATE		SURFACE AREA		SHAPE		COMPOSITION	
PURITY		SURFACE CHARGE		SURFACE CHEMISTRY		SURFACE REACTIVITY		SOLUBILITY		STABILITY		EX	
NR1012 - Au NP		★						★					No
NR965 - Au NP		★	★	★	★			★	★			★	No
NR812 - Au NR		★	★		★			★	★				No

✓ On the  
SEARCH  
RESULTS page

✓ On the  
DETAILS  
PAGE

**NR965**

NR Descriptor: Au NP  
Information for this nanomaterial was curated from [National Institute of Standards and Technology](#)  
Original Publication(s): Not reported  
Information reported: PCC Characterization? Yes ▲ Environmental interactions? No Biological interactions? No

Overall PCC Compliance Level: ★

Particle Size	★	Size Distribution	★	Aggregation/Agglomeration State	★	Surface Area	
Shape	★	Composition	★	Purity		Surface Chemistry	
Surface Charge	★	Surface Reactivity		Solubility		Stability	★

# Evaluating the Information

Compliance Level - work is ongoing

The **COMPLIANCE LEVEL** was designed as a **FLEXIBLE** tool

As terminology, standards, and techniques become relevant and/or obsolete, the terms and weighting factors behind the *compliance level score can be updated*.

The screenshot shows the 'Maintain CLR Analytics' web application. On the left is a sidebar with navigation links: 'CLR Categories', 'Technique Points', 'Measurement Points', 'Instrument Points' (which is highlighted), and 'Medal Rules'. The main content area has a search section titled 'Search CLR Instrument Points' with a dropdown menu set to 'Instrument Model' and a 'Search' button. Below this is a section titled 'CLR Instrument Points - Search Results' containing 'Delete', 'Update', and 'New' buttons. A table displays the search results with columns: 'Instrument Name', 'Model Or Manuf.', 'PCCID', 'PCC Name', 'Multiplier', 'Weight', 'Max Points', and 'Points'. Two rows are visible, both for 'Dynamic Light Scattering Instrument'.

Instrument Name	Model Or Manuf.	PCCID	PCC Name	Multiplier	Weight	Max Points	Points
<input type="checkbox"/> Dynamic Light Scattering Instrument	ZetaPALS	1	Particle Size	<input type="text" value="3"/>	<input type="text" value="1"/>	<input type="text" value="3"/>	<input type="text" value="1"/>
<input type="checkbox"/> Dynamic Light Scattering Instrument	Zeta Plus	1	Particle Size	<input type="text" value="3"/>	<input type="text" value="1"/>	<input type="text" value="3"/>	<input type="text" value="1"/>

*Implementation of new algorithms can be tested on actual data sets*

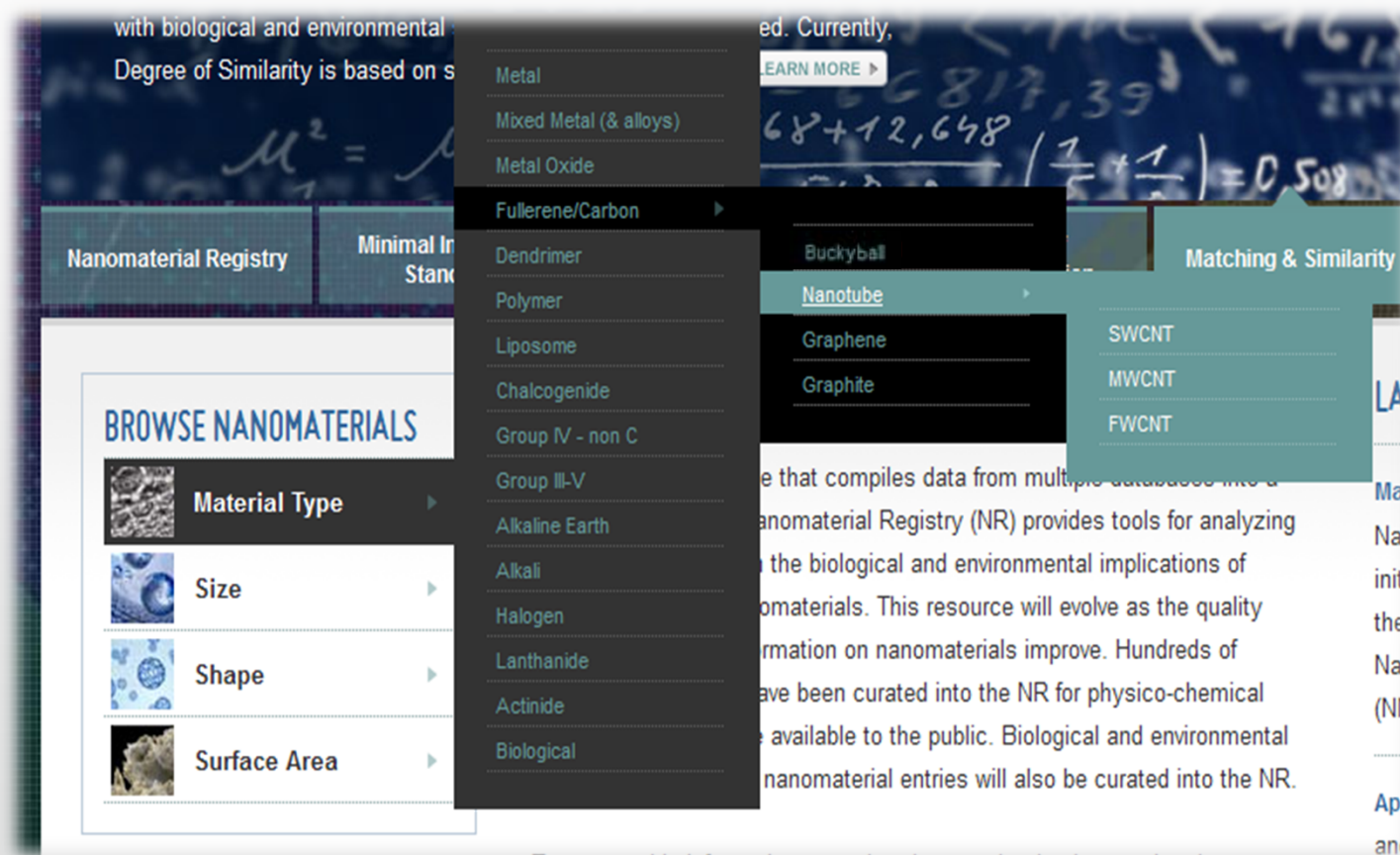


Data for decision making

# **SHARING THE DATA**

# Browse

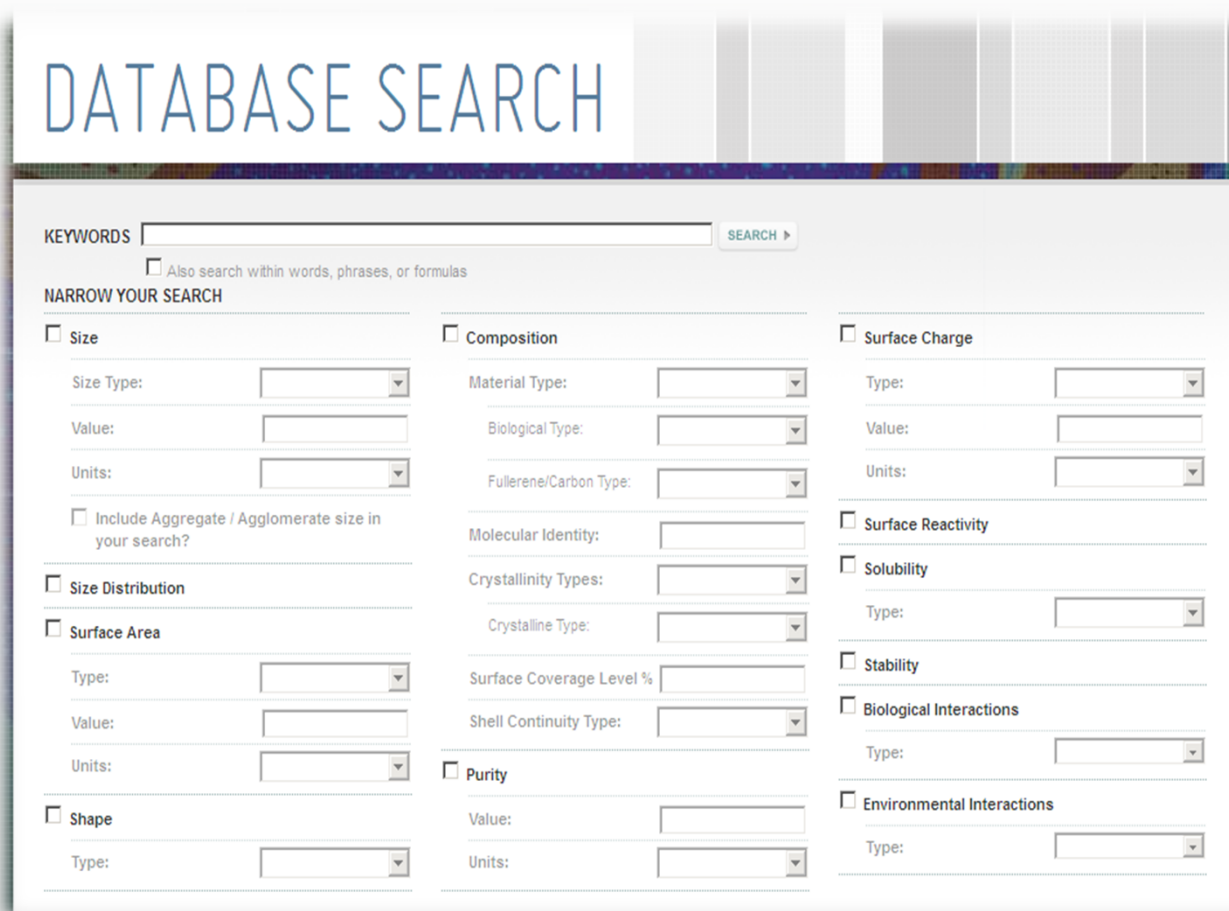
- Locate data using nanomaterial classifications



NANOMATERIALREGISTRY

# Search

- Find data using keyword(s) and specific characteristic(s)



**DATABASE SEARCH**

KEYWORDS

☐ Also search within words, phrases, or formulas

**NARROW YOUR SEARCH**

<input type="checkbox"/> <b>Size</b> Size Type: <input type="text"/> Value: <input type="text"/> Units: <input type="text"/> <input type="checkbox"/> Include Aggregate / Agglomerate size in your search? <input type="checkbox"/> <b>Size Distribution</b> <input type="checkbox"/> <b>Surface Area</b> Type: <input type="text"/> Value: <input type="text"/> Units: <input type="text"/> <input type="checkbox"/> <b>Shape</b> Type: <input type="text"/>	<input type="checkbox"/> <b>Composition</b> Material Type: <input type="text"/> Biological Type: <input type="text"/> Fullerene/Carbon Type: <input type="text"/> Molecular Identity: <input type="text"/> Crystallinity Types: <input type="text"/> Crystalline Type: <input type="text"/> Surface Coverage Level % <input type="text"/> Shell Continuity Type: <input type="text"/> <input type="checkbox"/> <b>Purity</b> Value: <input type="text"/> Units: <input type="text"/>	<input type="checkbox"/> <b>Surface Charge</b> Type: <input type="text"/> Value: <input type="text"/> Units: <input type="text"/> <input type="checkbox"/> <b>Surface Reactivity</b> <input type="checkbox"/> <b>Solubility</b> Type: <input type="text"/> <input type="checkbox"/> <b>Stability</b> <input type="checkbox"/> <b>Biological Interactions</b> Type: <input type="text"/> <input type="checkbox"/> <b>Environmental Interactions</b> Type: <input type="text"/>
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# COMPARISON

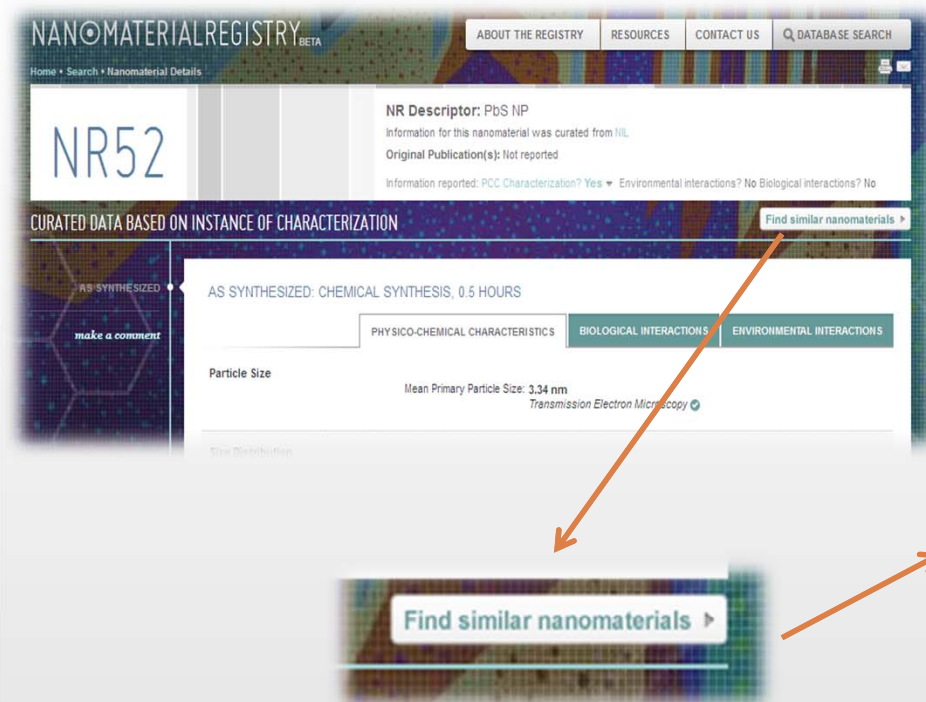
three data sets  
can be compared

## COMPARISON OF NANOMATERIAL DATA BASED ON INSTANCE OF CHARACTERIZATION

Name	NR27	NR40	NR207
Instance of Characterization Description	As Synthesized	As Synthesized <i>dissolution</i>	As Specified
General Information	Data Source: <i>NIL</i> Original Research Publication: Reported	Data Source: <i>NIL</i> Original Research Publication: Reported	Data Source: <i>CaNanoLab</i> Original Research Publication: Rep
Particle Size	Diameter: • Graphically Represented <i>Scanning Electron Microscopy</i>	Mean Primary Particle Size: • 24 nm <i>Scanning Electron Microscopy</i> • Graphically Represented <i>Scanning Electron Microscopy</i>  Thickness: • Graphically Represented <i>Scanning Electron Microscopy</i>	Diameter: • 13 nm
Aggregation / Agglomeration State	Aggregation/Agglomeration State: • Aggregated/Agglomerated <i>Scanning Electron Microscopy</i>		

Side by side  
comparison

# Find Similar Nanomaterials



**NANOMATERIALREGISTRY** BETA

Home • Search • Nanomaterial Details

NR52

NR Descriptor: PbS NP  
Information for this nanomaterial was curated from NILL.  
Original Publication(s): Not reported  
Information reported: PCC Characterization? Yes Environmental interactions? No Biological interactions? No

CURATED DATA BASED ON INSTANCE OF CHARACTERIZATION

AS SYNTHESIZED: CHEMICAL SYNTHESIS, 0.5 HOURS

PHYSICO-CHEMICAL CHARACTERISTICS BIOLOGICAL INTERACTIONS ENVIRONMENTAL INTERACTIONS

Particle Size  
Mean Primary Particle Size: 3.34 nm  
Transmission Electron Microscopy

Size Distribution

Find similar nanomaterials ▶

NANOMATERIALS SIMILAR TO NR52

Arrange by ▶ CLEAR COMPARISON SELECTION

COMPLIANCE LEVELS

Gold Silver  
Bronze Merit

	SIMILARITY	PCC COMPLIANCE	PARTICLE SIZE	SIZE DISTRIBUTION	AGGREGATION/ AGGLOMERATION STATE	SURFACE AREA	SHAPE	COMPOSITION	PURITY	SURFACE CHARGE	SURFACE CHEMISTRY	SURFACE REACTIVITY	SOLUBILITY	STABILITY	ENVIRONMENTAL	BIOLOGICAL
NR13 - Pt NP	30%	👤	👤			👤	👤									<input type="checkbox"/>
NR39 - buckey ball	30%	👤	👤			👤	👤									<input type="checkbox"/>
NR43 - FeOx NP	30%	👤	👤	👤		👤	👤									<input type="checkbox"/>
NR82 - CdSe QD	30%	👤	👤			👤	👤									<input type="checkbox"/>
NR83 - CdSe QD	30%	👤	👤			👤	👤	👤								<input type="checkbox"/>
NR120 - Mo NP	30%	👤	👤		👤	👤	👤	👤								<input type="checkbox"/>
NR121 - Zn NP	30%	👤	👤		👤	👤	👤	👤								<input type="checkbox"/>
NR141 - CdSe QD	30%	👤	👤			👤	👤	👤			👤					<input type="checkbox"/>
NR142 - CdSe QD	30%	👤	👤			👤	👤	👤			👤					<input type="checkbox"/>
NR143 - CdSe QD	30%	👤	👤			👤	👤	👤			👤					<input type="checkbox"/>

COMPARE SELECTED ▶ 1 2 ▶

NANOMATERIALREGISTRY

# Upcoming Features

- Data visualization tools
  - data pattern and trend recognition
- Data export tool
- User accounts/profiles for
  - Saved queries
  - Custom data visualizations
  - Saved data export settings
  - Other custom settings

Data for decision making

# **BENEFITS OF THIS APPROACH**

# Benefits

- ★ Foundational groundwork is in place
  - ✓ An **integrated data** set to interrogate and share
  - ✓ “Efficient” **data curation**
  - ✓ **Flexible** framework for adaptation of new discoveries and expanded scope
  - ✓ Incorporation of **standards**
  - ✓ **Connection** with community



Data for decision making

# **OUR VISION: BEYOND DATA CURATION**

# Utility of the Registry

- ★ The Nanomaterial Registry **VISION**:
  - ✓ **Infer properties** and functions when data are missing for a particular nanomaterial, but available for “similar” nanomaterials
  - ✓ Provide a mechanism to **identify similar nanomaterials** based on properties and endpoints
  - ✓ Identify data gaps and trends

Data for decision making

# **COMMUNITY VISION**

# Partnership

## **Working directly with researchers is advantageous**

- High compliance level data
  - Often more data/meta data is available from the researcher
  - Data to be used to answer broader research questions
- Early data capture
  - Archive data early in it's lifecycle
  - Store data in “non-public” data queue
  - Data can be made public at appropriate time
- A freely available Public tool
  - Data sharing
  - Influencing best practices in nano data informatics

# NAN⊙MATERIALREGISTRY

Thank You!