

Data management and adoption of the FAIR principle; perspective from a research institution

NATIONAL INSTITUTE FOR MATERIALS SCIENCE (NIMS)
MATERIALS DATA PLATFORM CENTER (DPFC)

MIKIKO TANIFUJI, MANAGING DIRECTOR
2021.6.18

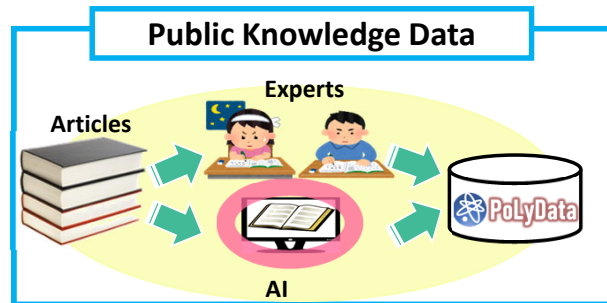




Research Data Platform, DICE – Starting 2020



Create



ML

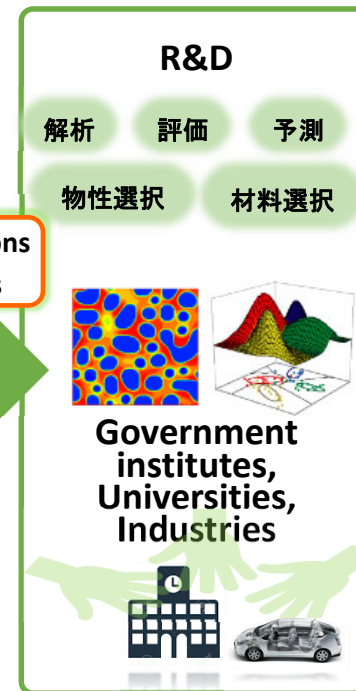
Store



Applications
& Tools

AI

Use



Publish

Publish data with DOI
via data repository



Share data under
research schemes



MDR Shared

Peer-review journal



A sister
journal of
STAM (IF5.8)

Register
to global
databases



研究データをつくる・ためる・つかう、とは？

English version
is not supported.



15 公開開始

所内公開

● 測ったそばから**使える形**でためる！

For details:

Materials Data Platform - a FAIR System for Data-Driven Materials Science

DOI: [10.1109/IIAI-AAI.2019.00206](https://doi.org/10.1109/IIAI-AAI.2019.00206)



成膜装置:
新材料の合成



XRF:
元素組成の分析



XRD:
結晶構造の分析



AFM:
表面形状の分析



XPS:
化学種の分析

データ構造化・登録システム

様々な実験装置からのデータを一覧

Filter By:

Result: 15

検索やフィルタで絞り込み

AES Reference Spectral Set

Dataset_ID: 56338950

JAMP9500Fによる参照オーグեսペクト...

Reference AES spectral set obtained with JAM...

1209 Data | Edited by OGIWA...

201 View | 41 Download

measurement

AES Auger reference spectrum

surface anal... quantitative ... qualitative a...

Monochromated EELS of LiCoO₂ and related materials

Dataset_ID: 55679817

Liイオン2次電池の正極材料として用いら...

EEL spectra of LiCoO₂ and related materials f...

10 Data | Edited by KIMOTO, Koji

58 View | 26 Download

measurement

EELS monochrom... Li battery

XAFS data

Dataset_ID: 64567741

XAFSソサエティデータ X線吸収分光スペ...

XAFS society data For development of materi...

0 Data | Edited by ISHII, Masashi

0 View | 0 Download

measurement

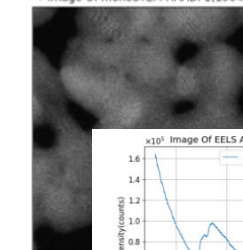
X-ray Spectroscopy Absorption

Local struct... Standard sa...

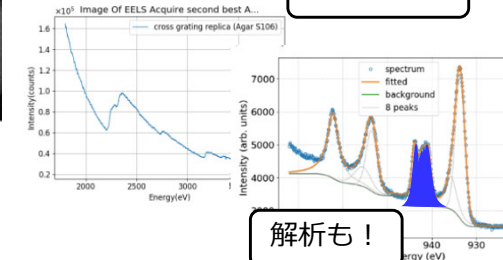
実験データ
説明情報

タグ付

電子顕微鏡写真



スペクトル



解析も！

実例：

- 3次元アトムプローブのFIB加工条件の記録
- コンビナトリアル法によって合成した組成傾斜膜の蛍光X線分析による組成分布画像の記録

論文：

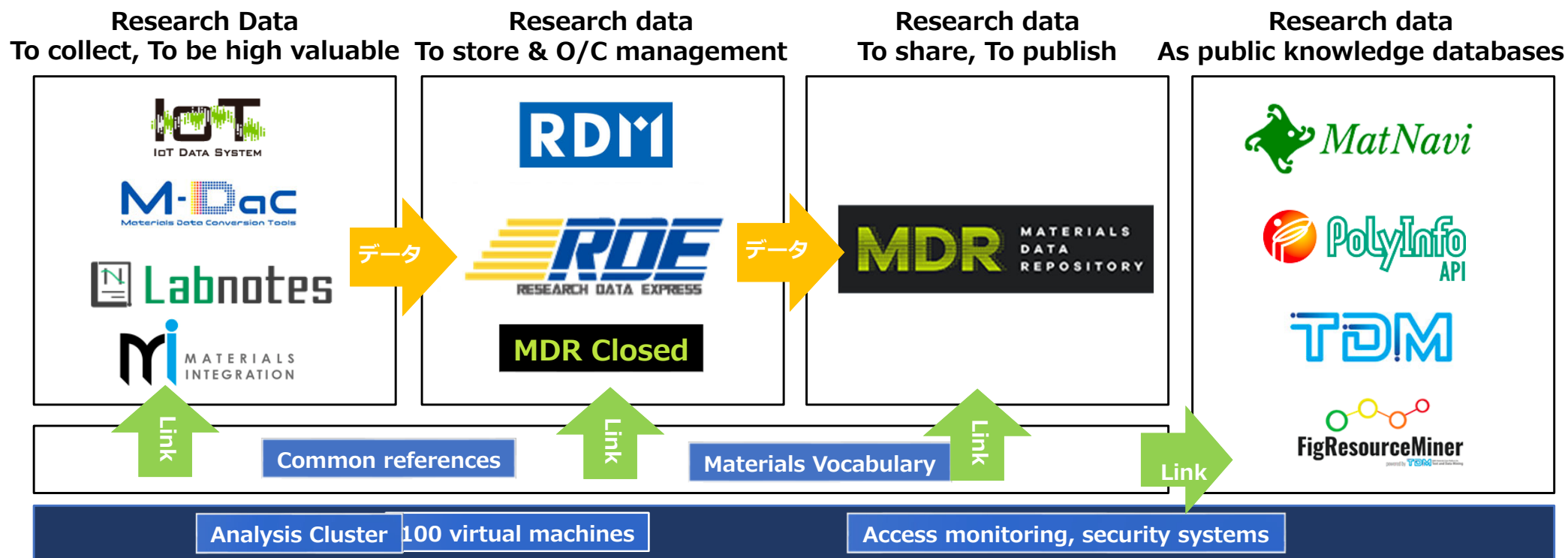
"IoT データ収集システムのデータアーキテクチャ" 情報処理学会論文誌デジタルプラクティス (2021)



DICE Data Services – to use – by FAIRable

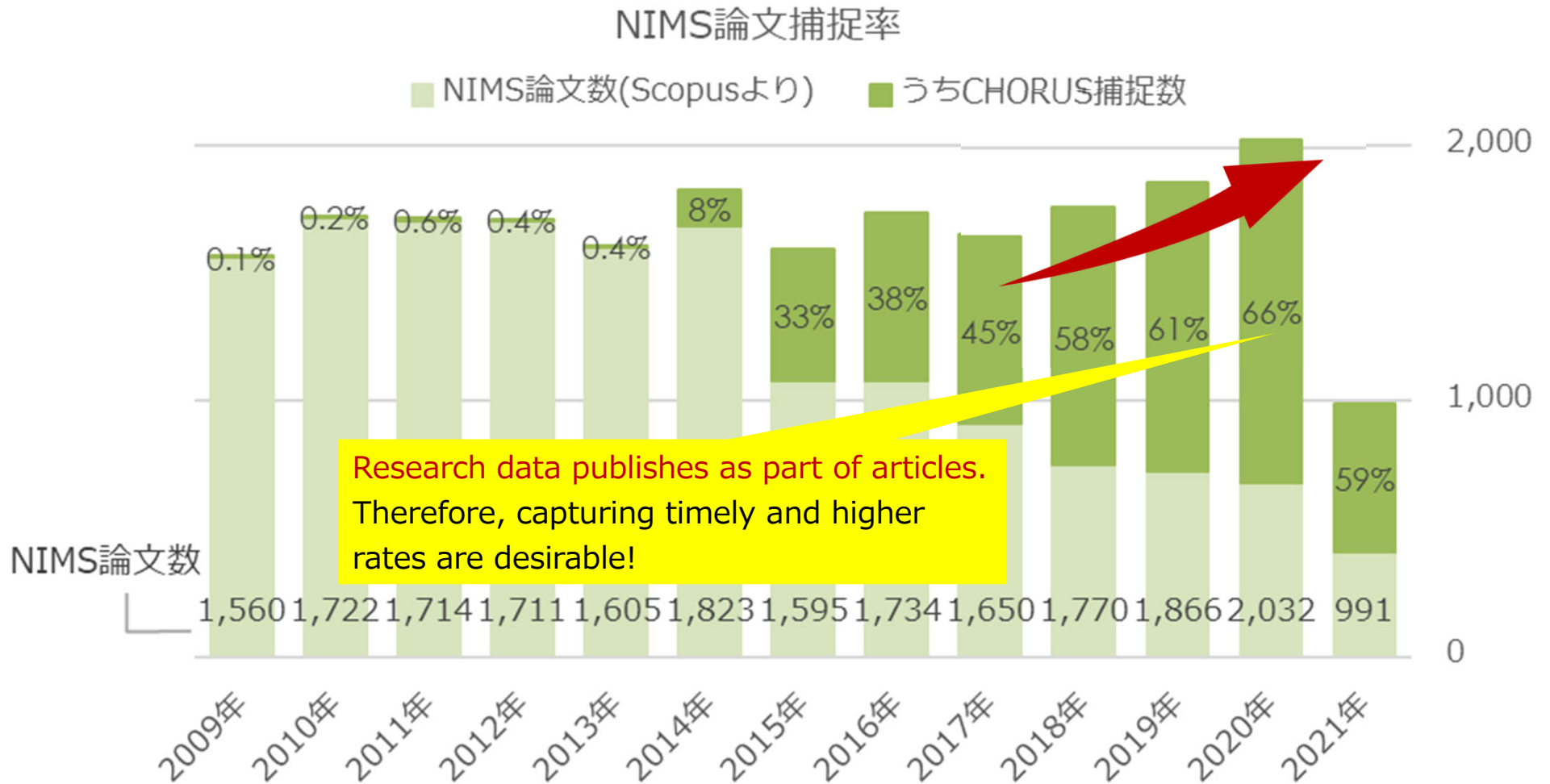


User authentications





What we see by CHORUS – capture rates of articles



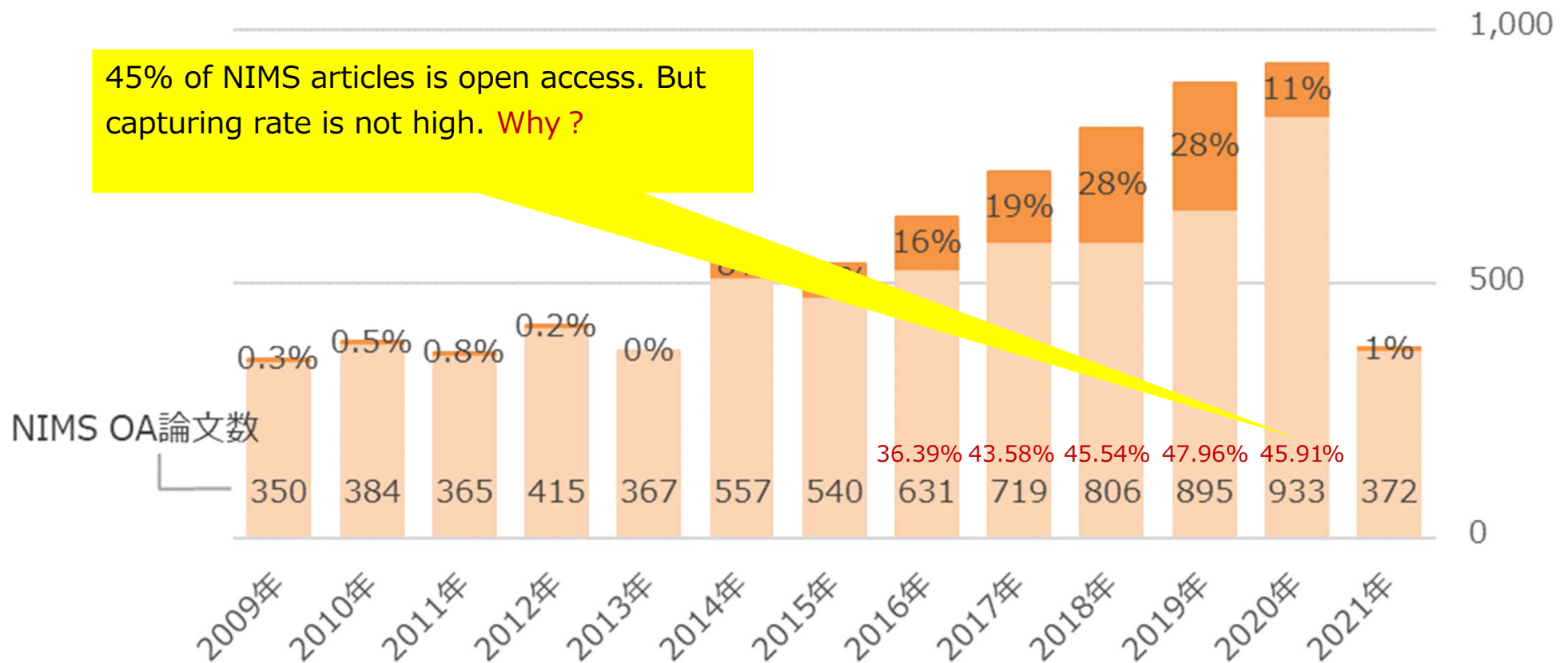


What we see by CHORUS – Capturing Open Access is not high.



NIMS OA論文捕捉率

■ NIMS OA論文数(Scopusより) ■ うちCHORUS捕捉数

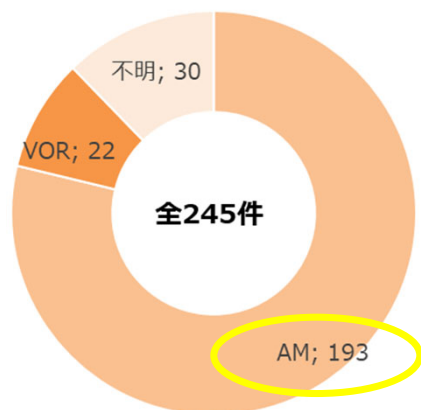




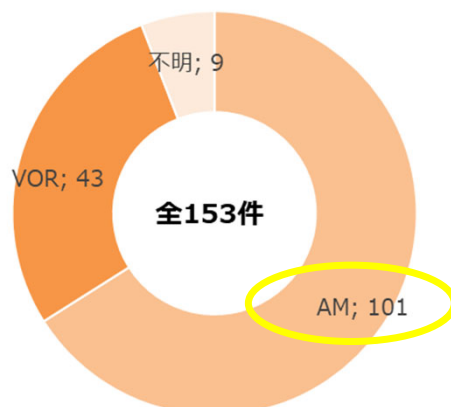
What we see by CHORUS – VOR vs AM



American Physical Society



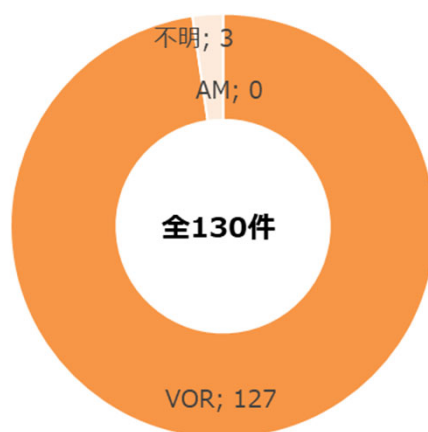
Elsevier



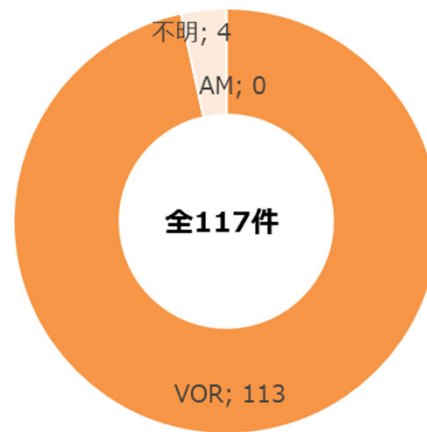
VOR: Version of Record (出版社版)、AM: Author Manuscript (著者版)

Among top 5 publishers, AM is well distributed
APS (No.1) と Elsevier (No.2) .
Appreciated publishers who supports authors
versions with DOI distributions (so that we can
capture via CHORUS).

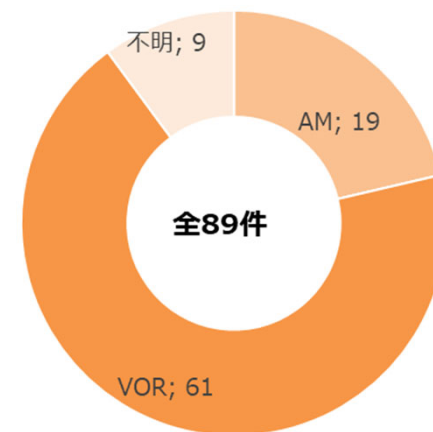
Wiley



American Chemical Society



The Royal Society of Chemistry





What we see by CHORUS – Data sets



	2021年2月	2021年6月
NIMS articles	5,747	6,176
No of data sets in articles	97	96
No of DOI of data sets	242	232
CCDC & Fiz Karlsruhe	212	207
Zenodo	9	16
figshare	4	5
その他	5 ※1	4 ※2
Crossref	12	0

→ See the next

— All are the DOIs of articles (not data sets;)

※1 : Mendeley Data, Dryad, Citrine Informatics, Apollo (Univ. of Cambridge),
CXIDB: Coherent X-ray Imaging Data Bank

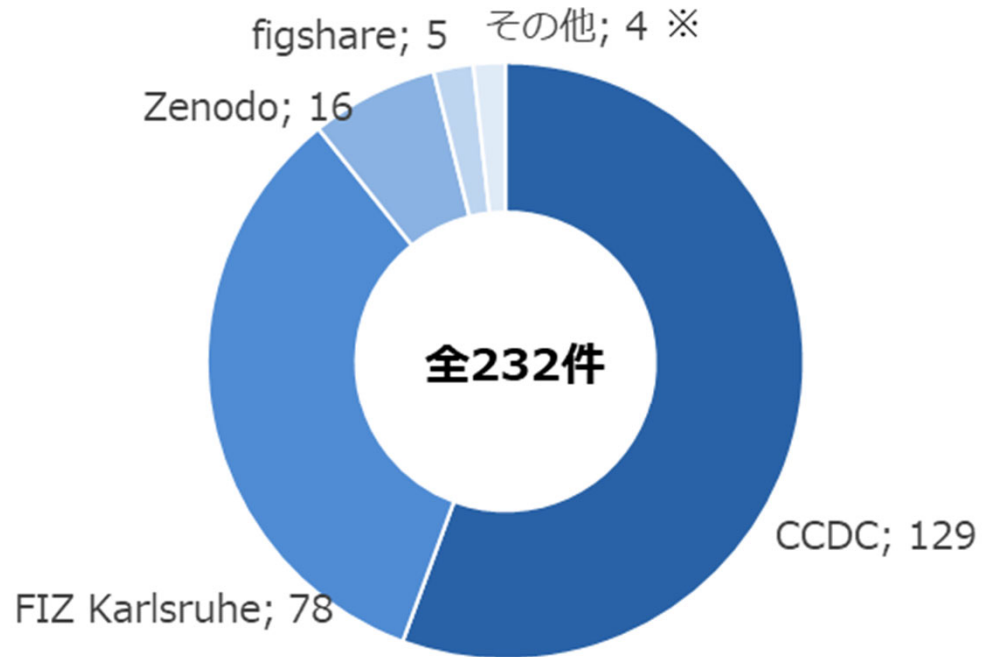
※2 : Mendeley Data, Dryad, Citrine Informatics, Apollo (Univ. of Cambridge)



What we see by CHORUS – Data sets for scientific use! – The most important reason.

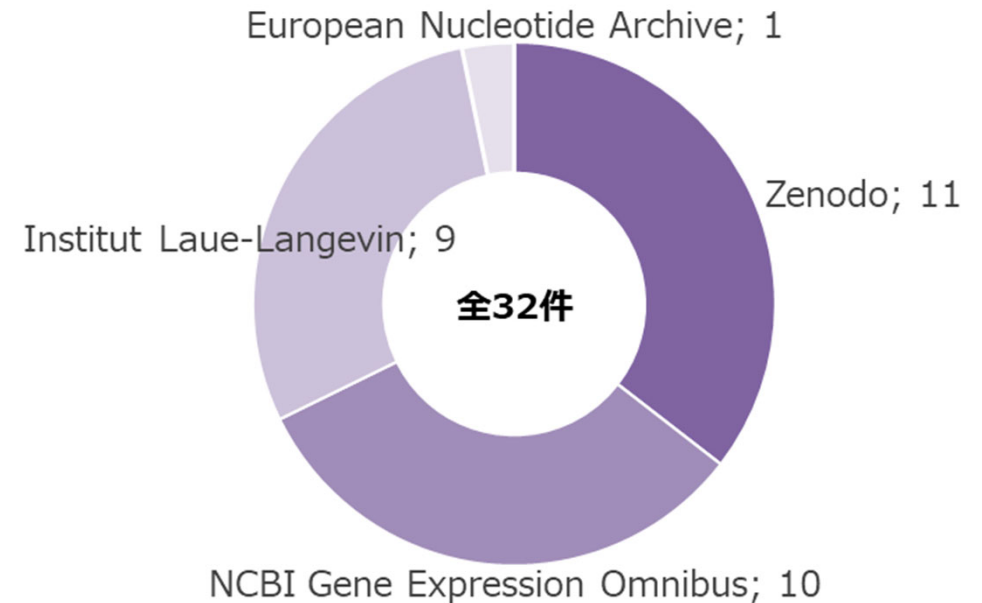


CHORUS: breakdown use of data sets with articles



※その他 : Mendeley Data, Dryad, Citrine Informatics, Apollo (Univ. of Cambridge)

Reference : Web of Science: Data Citation Index (DCI)
NIMS data sets indexed in databases, repositories



Research data are often indexed in data catalogues and database (ex. CCDC) that are very important FAIR channels as truly useful data resources.



DICE is a data platform for all experts
and applications for materials science

"As a researcher, it is tedious to provide a universal, machine-readable data to be used in serendipitous ways."

"As a materials scientist, there is a particular material I am looking to design a model for AI-assisted research."

"As a data scientist, I am looking for materials data that I can use."
DICE provides three things: high-quality data, applications, and domain experts to aid rapid advancement in materials science.



Acknowledgement :

Many thanks to Ms. Chie Onodera, a Digital Librarian at NIMS Library.
Our ideas come from day-to-day wondering, "Why? How?? Still ... But!",
And we are still moving on towards Materials DX.