JRC-IET activities in support of engineering materials data preservation and reuse

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European Commission
JRC Institute for Energy and Transport

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JRC IET—Information Systems

JRC Institute for Energy and Transport in The Netherlands / Italy hosts a wide range of information systems in support of European policies.

- Technology trends
  - SET-Plan
- Modelling
  - Smart grids
- Operational data
  - NPPs
  - Hydrogen
- Human resources data
  - Nuclear
- Research data
  - Hydrogen
  - Engineering materials


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Wind Energy
Welcome to SETIS - Towards a low-carbon future
The Information System fo
Strategic Energy Technology
The European Strategic En
(SET)-Plan aims to transform e
and use in the EU with the go
worldwide leadership in th
energy technological soluti
delivering EU 2020 and 2050 t
towards a low-carbon E
innovative research, effective strategic planning and an emphasi
appropriate action.
SETIS
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SETIS highlights
Assessing the technological possibilities and ec
electricity storage
07/11/2013
Spurred by a renewed interest in power storage,
several recommendations in a recently published report on how to
improve assessing the economic value of storing electricity. Drafted in cooperation
with the R&D Department of Electricité de France (EDF), it presents an overview of the
current research on the economic drivers or barriers for electricity storage.

JRC IET—Smart Grids

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JOINT RESEARCH CENTRE

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Data Gathering And Processing

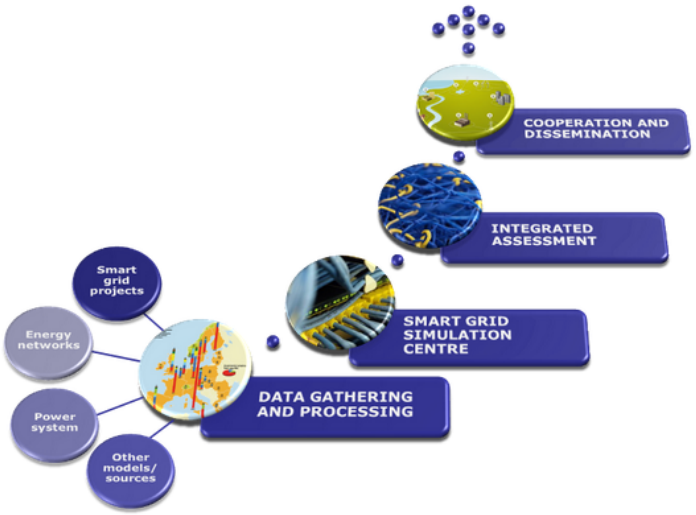
The first pillar of our activities is Data Gathering And Processing.

(go to second pillar)

We perform data collection on power systems and smart grid projects in order to update the JRC's European power system database and smart grid inventory. We constantly maintain and expand extensive European databases including commercial and proprietary data.

Here below you can learn about some crucial examples:

- We implemented a European-wide electricity grid model including more than 10,000 elements (nodes and lines) of Europe's transmission grid, starting from data from the European Transmission System Operators, which was complemented by other datasets from the European power system. More information here.
- We built and are maintaining the most comprehensive inventory of Smart Gird projects in Europe. The 2012 catalogue features almost 300 Smart Grid projects scattered across Europe. Project results provide information about how Smart Grids can help integrate more renewables, accommodate electric vehicles, give more control to consumers over their energy consumption, avoid blackouts and restore power quickly when outages occur. More information here.



JRC IET—Clearinghouse

The 'Clearinghouse' objectives

The overall objectives of the European Network on Operational Experience Feedback for Nuclear Power Plants are to facilitate efficient sharing and implementation of operational experience feedback to improve the safety of Nuclear Power Plants, in particular:

Do you know the 'Clearinghouse' tasks?

1. Fostering the collection of operating experience from European nuclear regulators or operators, assessing the potential value of lessons learned, and ensuring that events relevant for the global OEF are reported systematically and in consistent manner to the IRS system operated by NEA/IAEA.

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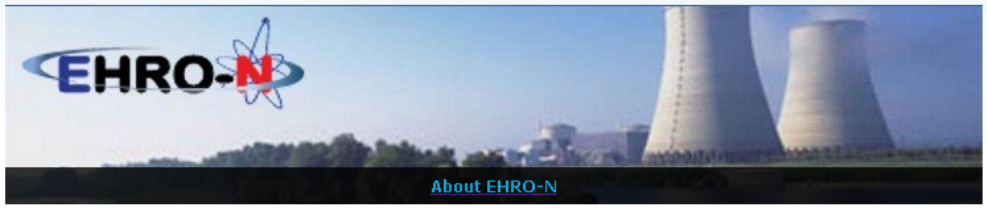
European Human Resources Observatory for the Nuclear Energy Sector



Latest EHRO-N News

The European Forum to discuss Nuclear Technology Issues, Opportunities & Challenges
Training course: 11 May, 2014 to 15 May, 2014
More

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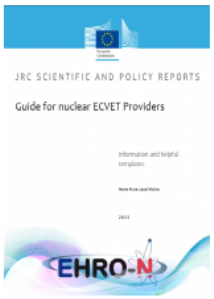
External News

- IAEA Delivers Final Report on Remediation in Fukushima to Japan
  24 January, 2014 - 07:47

Guide for nuclear ECVET Providers



In 2010, the Institute for Energy and Transport of the European Commission's Joint Research Centre started supporting the implementation of the European Credit Vocational Education and Training system (ECVET) in the nuclear energy sector. This report provides a wide range of supporting information for the

Current use of ECVET in the nuclear industry sector of the EU-28

This study was carried out from July-September 2013 in order to analyse the current use of the European Credit system for Vocational Education and Training (ECVET) in the nuclear energy sector in the European Union Member States. ECVET aims to create a strong and efficient link between the Education and Training 2020 Strategy and the European Employment Strategy by facilitating processes for the validation, transfer and accumulation of learning outcomes into the corresponding practices.

JRC IET—ODIN Portal

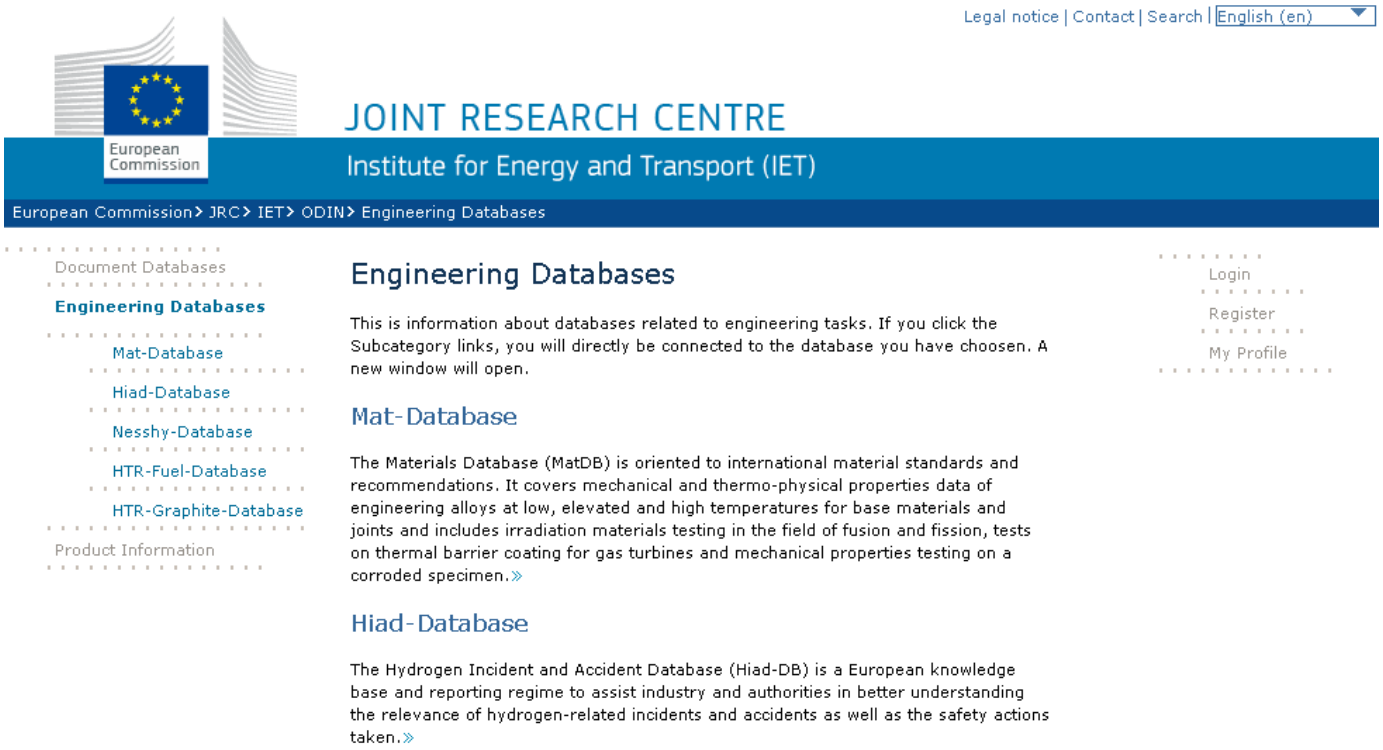
ODIN Portal—Purpose

The ODIN Portal is designed to manage European research data in the domains of nuclear, conventional, and renewable energies.

- Support the research process
  - Enable effective exchange of information
  - Provide analysis and evaluation options
  - Deliver innovative services
- Preserving the research investment
  - Preserve the significant financial investments
- Enable reuse of data
  - Validation
  - Reuse beyond the scope in which the data were produced
  - Codes and standards development

ODIN Portal—Scope

ODIN hosts a collection of online scientific databases organized into three categories, namely engineering data, documents and product information.



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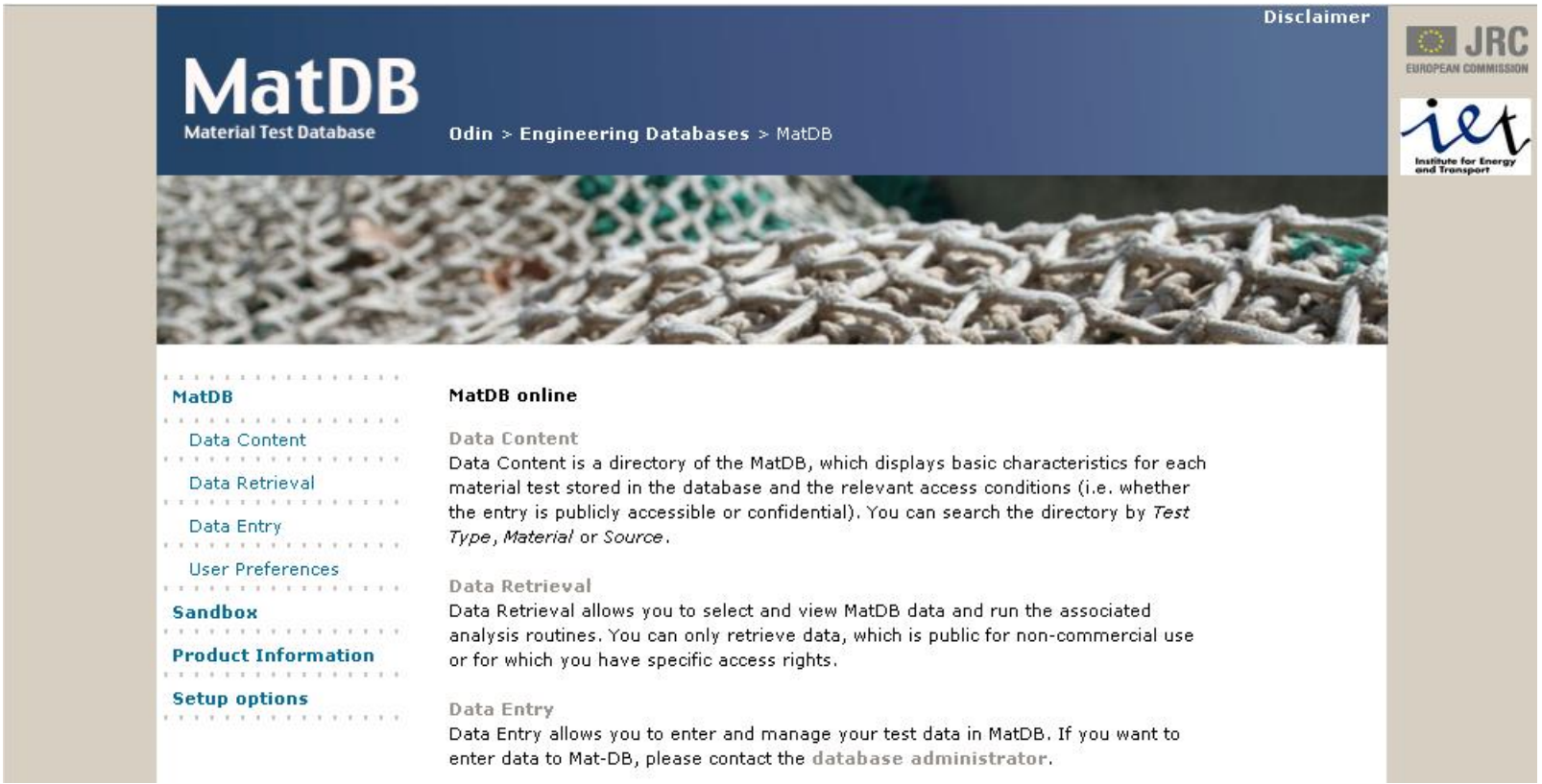
In the engineering category, MatDB is an engineering alloys database that contains experimental data coming mainly from European R&D projects.



MatDB—Scope

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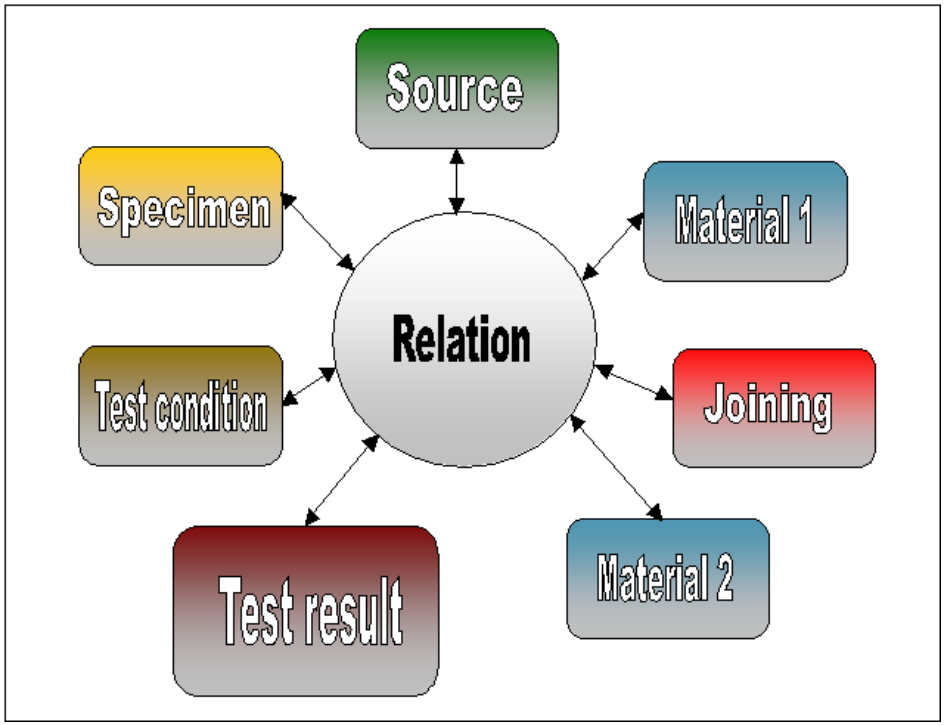
MatDB manages mechanical and physical properties data generated according to European and international testing standards.

MECHANICAL PROPERTIES	IRRADIATION
CRACK GROWTH & FRACTURE	**Irradiation creep**
Creep crack growth	**Swelling**
Cyclic creep crack growth	**In-pile relaxation**
Fatigue crack growth	TENSILE
Fracture toughness	**Compression**
Impact	**Multiaxial tensile**
CREEP	**Uniaxial tensile**
Cyclic creep	**Small punch tensile**
Multiaxial creep	THERMO-PHYSICAL PROPERTIES
Torsional creep	**Density**
Uniaxial creep	**Electrical resistivity**
Small punch creep	**Emissivity**
RELAXATION	**Linear thermal expansion**
Multiaxial relaxation	**Poisson's ratio**
Uniaxial relaxation	**Specific heat**
FATIGUE	**Shear modulus**
High cycle fatigue	**Thermal conductivity**
Low cycle fatigue (load control)	**Thermal diffusivity**
Low cycle fatigue (strain control)	**Young's modulus**
Thermal fatigue	CORROSION
Thermo-mechanical fatigue	**High temperature corrosion**
Creep-fatigue interaction	**Complex test**

MatDB—Data Model

The data model on which MatDB is based on a de facto standard established in collaboration national laboratories in the US and Japan.



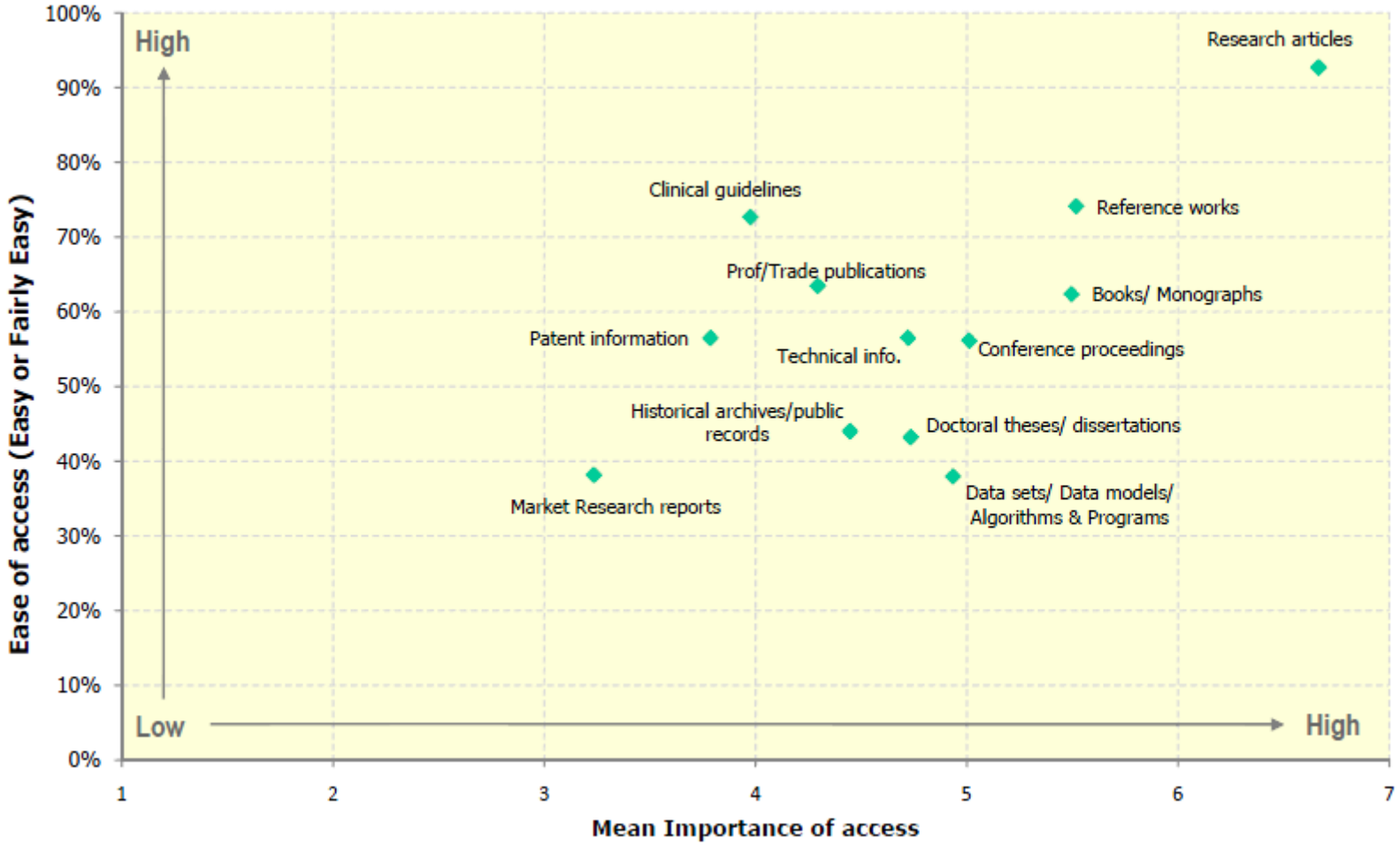
Material entity
Chemical composition
Designation & production
Characterisation
Isotropic grain size
Duplex grain size
Directionally solidified grain size
Hardness
Microstructure
Phase
Physical constants
Thermo-mechanical heat treatment
Customer internals

Materials Data Challenges

The engineering materials industrial and research communities face various data management challenges.

- Data preservation
  - Additional overheads
  - Projects aim to develop new knowledge
- Data transfer
  - Wide-ranging end-user requirements
  - Diverse range of electronic systems
  - Different data sources
- Data sharing
  - Research data has intellectual value
  - Research data has commercial value

Access vs Importance

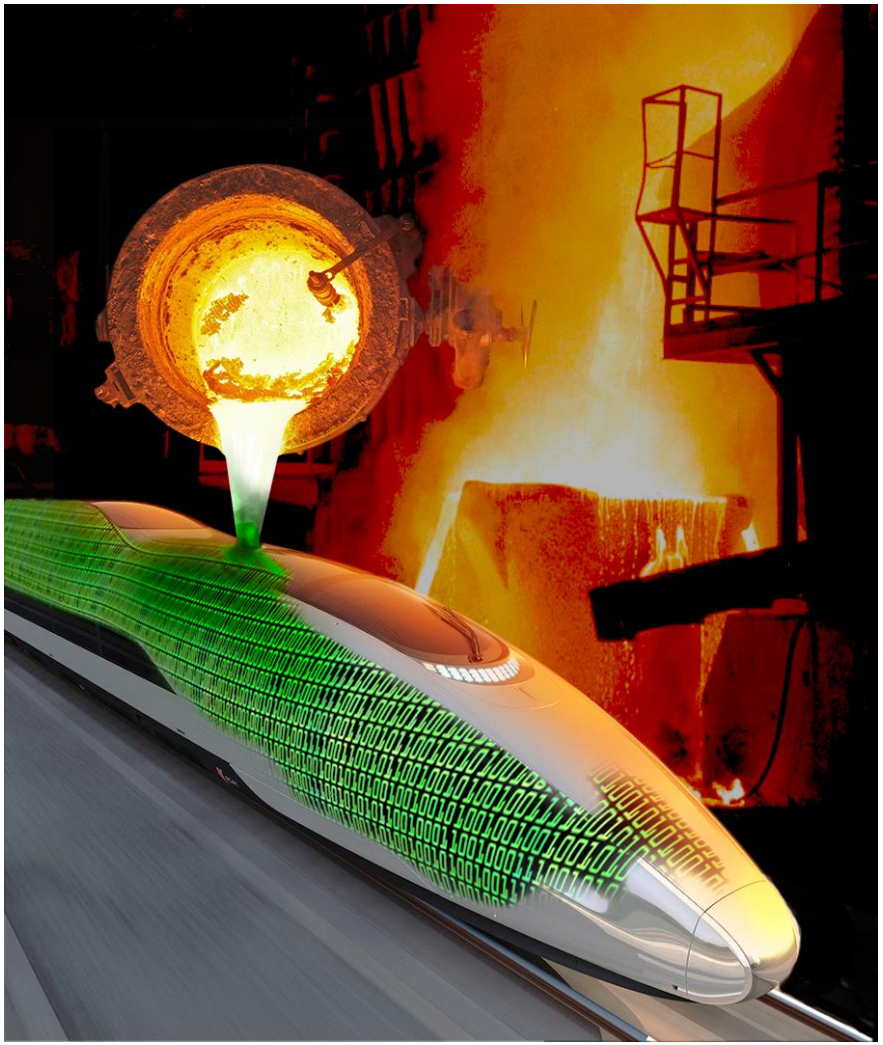


Source: PRC (2010) Access vs. Importance (http://www.publishingresearch.net/documents/PRCAccessvsImportanceGlobalNov2010_000.pdf)

ICT Standards

JRC IET supports the development of standards for materials data.

- CEN Workshops on ICT Standards for engineering materials data
- CEN/WS ELSSI-EMD
  - Ontologies and schemas for engineering materials test data
- CEN/WS SERES
  - Ontologies and schemas for engineering materials data
  - Transition to electronic reporting in the engineering sector
- MatDB is enabled for the ELSSI-EMD technologies



Data Citation

MatDB has recently been enabled to support data citation using DataCite DOIs.

- Data citation is integrated into the data entry workflow
  - DOIs can be requested for any validated data set
  - DOIs are automatically minted using the DataCite API (Web Service)
- Data citation respects different access management levels
  - Open access
  - Registered access
  - Restricted
- Data citation promotes data sharing
  - Researchers are acknowledged in derivative works
  - Industrial organizations may gain a commercial advantage
- Data citation promotes European research and innovation
  - Contributes to the generation of new knowledge
  - Guards against redundancy

Data Publication

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Citation: Gülçimen, B;Haehner, P;Hurst, R.;De Haan F.;Ramos, C.C; Mendes, J. (2014): Test data for small punch creep on material P91 at 600 Celsius, version 1.0, European Commission JRC Institute for Energy and Transport, [Dataset], http://dx.doi.org/10.5290/410048

Version: 1.0: 09-01-2014

Meta Data | Source Details | Material Details | Test Conditions | Specimen Details | Test Details | Curve Details

DOI Metadata:

Identifier	http://dx.doi.org/10.5290/410048
Creators	Gülçimen, B;Haehner, P;Hurst, R.;De Haan F.;Ramos, C.C; Mendes, J.
Creator organization	EC - JRC Petten, Institute for Energy and Transport
Title	Test data for small punch creep on material P91 at 600 Celsius
Publisher	European Commission JRC Institute for Energy and Transport
Publication year	2014
Subject	Elevated temperature material properties
Project Leader	Gülçimen, B; Haehner, P
Date issued	2014-1-9
Resource type	Dataset
Resource subtype	Test data
Format	text/plain
Language	en

Questions

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