The NEA Thermochemical Database Project (TDB) represents an international reference point with regard to high standard thermochemical data for the radioactive waste management community.

High-quality thermochemical data

- For performance assessments of deep geological repositories.
- Internally consistent formation and reaction data for ~1,500 relevant species (aqueous, solid and gas).

A work philosophy

- Transparent evaluation and selection of data based on expert reviews of traceable scientific literature.
- Independent expert validation (peer review), strict technical and procedural guidelines.
- Commitment to knowledge management, and project management at the international level.
Motivation
Meeting the need for an internationally-recognised, high-quality thermochemical database for safety assessments of deep geological repositories

Background
- Safety assessments of deep geological repositories include analysis of potential radionuclide transport through engineered and natural barriers.

The role of thermochemical data
- The prediction of radionuclide migration from near-field into the far-field and biosphere encompasses solubility and speciation calculations (geochemical modelling).
- Geochemical modelling relies on available thermochemical data.

The NEA response
- Internationally-recognised, internally consistent, non-site-specific, and fully traceable database of high-quality thermochemical data.
- Availability of high-quality data through the TDB contributes to quality assurance in geochemical modelling.
- Harmonisation of workflow, selection process, methodologies and standards.

Publications and data services
Thorough critical reviews for selected elements and online, free-of-charge access to quality-assured thermochemical data

The Chemical Thermodynamic Series (CTS)
- Peer-reviewed publications on the thermochemical properties of selected elements and state-of-the-art reports (SOARs).
- Tables of selected data, detailed discussions on the selection process, and expert reviews of relevant articles.

CTS volumes published
- Uranium · Americium · Technetium · Neptunium and Plutonium · Update of Actinides and Technetium · Nickel · Selenium · Zirconium · Organic Ligands · Solid Solutions (SOAR) · Thorium · Tin · Iron (Part I)

Upcoming publications
- Iron (Part II) · 2nd Update of Actinides and Technetium · Ancillary Data · Molybdenum · Cements (SOAR) · High Ionic Strength Systems (SOAR)
Community engagement

Organisation of courses on thermochemical data selection, publication of articles

**TDB course on thermodynamic data collection and assessment**

One-day course in conjunction with major conferences. Contents:

- An overview of the TDB activities.
- A walk-through of the guidelines for collection and analysis of thermochemical data.
- Practical application examples of critical evaluation and assessment.
- World-class experts and invited speakers.
- For scientists and professionals at different career stages.

**Articles**


There are 15 sponsoring organisations from 12 NEA member countries in the current phase of the project (TDB-6):

Belgium
NIRAS/ONDRAF

Canada
NWMO

Czech Republic
SÚRAO

Finland
POSIVA

France
ANDRA/CEA

Germany
KIT

Japan
JAEA

Netherlands
COVRA

Sweden
SKB

Switzerland
NAGRA/ENSI/PSI

United Kingdom
RWM

United States
DoE

Links

TDB project – www.oecd-nea.org/dbtdb

CTS volumes – www.oecd-nea.org/dbtdb/info/publications

TDB project guidelines – www.oecd-nea.org/dbtdb/guidelines

Electronic TDB – www.oecd-nea.org/dbtdb/tdbdata

TDB courses – www.oecd-nea.org/dbtdb/courses/tdb2019

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