

New NIST database on gas hydrates to aid energy and climate research

October 7 2009

The National Institute of Standards and Technology has developed a free, online collection of data on the properties of gas hydrates, naturally occurring crystalline materials that are a potential energy resource and also may affect the Earth's climate.

Sometimes described as "flammable ice," hydrates consist of [water molecules](#) that create cages around "guest molecules" such as methane, which is one carbon atom bonded with four hydrogen atoms, a principal component of natural gas. Vast stores of hydrates exist in subsurface sediments of permafrost and deep oceans and are considered a major potential energy resource. The U.S. Geological Survey estimates that the total amount of carbon captured in [methane hydrate](#), worldwide, is at least twice the total amount held in fossil fuels. The flux of hydrates in the environment may play a role in the global [carbon](#) cycle and long-term climate patterns.

NIST researchers spent three years combing the literature on gas hydrates and comparing and evaluating data collected in experiments by numerous sources. The database contains about 12,000 individual data points for about 150 compounds spanning 400 different chemical systems. The data include phase equilibria (proportions of solid, liquid and gas phases in a material at a given temperature and pressure) and thermophysical property information such as [thermal conductivity](#).

The NIST web interface also provides the first electronic access to scientific results from the 2002 Mallik research well in Canada, an

international geophysical experiment exploring the properties of naturally occurring hydrates and the feasibility of using them as energy resources.

The new database is meant for use by climate modelers, researchers studying the potential recovery of hydrates for practical applications and the petroleum industry, which has long been interested in preventing unprocessed hydrates from infiltrating [natural gas](#) pipelines.

The NIST gas hydrates web site uses technology that acts like a desktop computer application. Whereas traditional web interfaces do most of their work on a file server, transmitting information slowly to clients over network connections, the new NIST web interface provides fast, customized service by doing much of the data sorting and presentation on client computers.

The database is available at gashydrates.nist.gov .

Source: National Institute of Standards and Technology ([news](#) : [web](#))

Citation: New NIST database on gas hydrates to aid energy and climate research (2009, October 7) retrieved 1 May 2024 from <https://phys.org/news/2009-10-nist-database-gas-hydrates-aid.html>

<p>This document is subject to copyright. Apart from any fair dealing for the purpose of private study or research, no part may be reproduced without the written permission. The content is provided for information purposes only.</p>
--