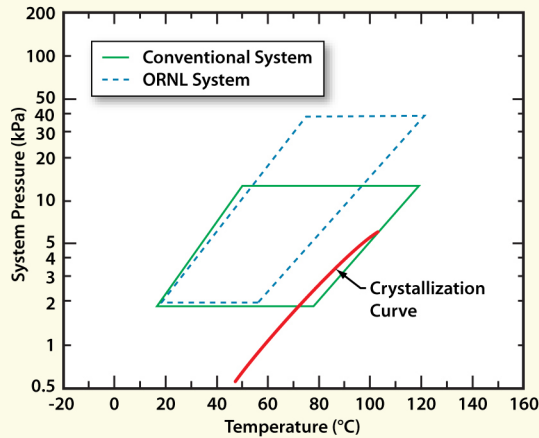


Energy Saving Absorption Heat Pump Water Heater

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Technology Summary

ORNL's new absorption heat pump and water heater technology offers substantial energy savings and can reduce the use of fossil fuels by buildings. While conventional heat pump water heater designs are limited to using toxic ammonia water systems, this system uses heat drawn from the ambient environment to achieve energy efficiency. This approach extends the application of the invention beyond industrial settings to residential and commercial use.

The system features one assembly with a condenser and an evaporator, a second assembly with an absorber, a desorber, and a heat exchanger, and a thermal coupler. The system employs lithium bromide, which is now widely used in commercial air conditioning. In current systems, however, efficiency has been limited by crystallization at the solution heat exchanger outlet and at the absorber.

ORNL researchers found a way to avoid crystallization by increasing evaporating pressure. Further crystallization is averted by directing the process water first through the absorber and then through the condenser. The water flow direction can be changed at run-time to optimize performance.

Advantages

- Energy efficient and environmentally friendly
- Substantial energy savings compared with conventional gas-fired water heaters
- Lithium bromide water absorption, now commercialized for cooling applications, is easily available

Potential Applications

- Residential and commercial water heating
- Alternative versions offer industrial process heat generation and boiler preheating

Patent

Omar Abdelaziz, Edward Allan Vineyard, and Abdolreza Zaltash, *Absorption Heat Pump System and Method of Using the Same*, U.S. Patent Application 12/829,940, filed July 2, 2010.

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