

Experimental study and comparison of thermochemical resorption refrigeration cycle and adsorption refrigeration cycle

[T.X. Li](#), [R.Z. Wang](#), [J.K. Kiplagat](#), [H. Chen](#)

Institute of Refrigeration and Cryogenics, Shanghai Jiao Tong University, Shanghai 200240, China

Abstract

The cycle characteristics of thermochemical resorption refrigeration system were investigated, and the experimental comparison between the basic resorption cycle and adsorption cycle was performed. Experimental results showed that the conversion rate during the regeneration phase in the resorption refrigeration cycle was higher than that in the adsorption refrigeration cycle at the same constraining temperatures. However, the conversion rate was lower during the cold production phase in the former cycle than in the latter cycle. Moreover, the reaction plateau temperature in the resorption cycle was lower than that in the adsorption cycle at the same regeneration temperature and heat sink temperature. The thermal capacity of metallic part of reactor has a stronger influence on the system performance for the resorption cycle compared with the adsorption cycle. At a regeneration temperature of 180 °C, heat sink temperature of 25 °C and refrigeration temperature of 10 °C, theoretical results showed the COP of a simple test unit operating on the resorption cycle to be 0.40. The resorption refrigeration technology is more suitable for cold production in some special situations where the presence of liquid is not desirable.

Keywords

- Thermochemical;
- Adsorption;
- Resorption;
- Refrigeration;
- Cycle characteristic