

New Absorption Air-Conditioning System

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Abstract

Along with the popularization of small-scale power generation systems, absorption air conditioning systems are applied frequently. Surplus of heat from fuel cells or gas turbines and others will continue to increase, and thus, there is a possibility that absorption refrigeration systems by heat driven increase its share of the market than compression refrigeration systems by electric driven. On the other hand, ice thermal storage systems are in wide spread use remarkably by using night electricity, because of peak cut of daytime electricity or equalization electricity of daytime and night in summer.

In this study, it is suggested effective energy utilization by concentrating and storage of working fluid for absorption refrigeration systems using surplus heat or cheap electricity in midnight. Concentrating of lithium-bromide aqueous solution of one of the working fluid for absorption refrigeration systems have effect as storage of evaporative latent heat of water. 75wt% lithium-bromide aqueous solution can absorb water becoming thin to 58wt%, and this mean storage of water latent heat of 700kJ/kg. This fact effect over twice of an ice thermal storage system because that is about 320kJ/kg (IPF=0.9). Stocked high concentrate lithium-bromide aqueous solution can be used on absorption refrigeration systems in daytime and cut peak of electricity. Of cause lithium-bromide aqueous solution can be used for absorption heat pump systems, it is available in winter season too.

An absorption air-conditioning system containing an energy storage system by using lithium-bromide aqueous solution was estimated the possibility. Additionally, a new absorption cycle was estimated with modifications of the regenerator and the condenser.

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