

عنوان مقاله:

Experimental Investigation of the Hybrid Nanoparticles into the LiCl Liquid Desiccant as Nanofluid on the Efficiency of Absorption Dehumidification System

محل انتشار:

مجله تحقیقات انتقال حرارت و توده، دوره 11، شماره 1 (سال: 1403)

تعداد صفحات اصل مقاله: 14

نویسنده:

Seyed Amir Hossein Zamzamian - Materials and Energy Research Center (MERC), Imam Khomeini Blv., Meshkindasht, Karaj, P.O.Box ۳۱۷۸۷-۳۱۶, Iran

خلاصه مقاله:

In this study, to increase the heat and mass transfer coefficients in the system, a combination of liquid desiccant such as lithium chloride (LiCl) and hybrid nanoparticles of multi-walled carbon nanotubes (CNT-MW) Aluminum Oxide (Al₂O₃) and silicon oxide (SiO₂) has been used. Poly-Vinyl Pyrrolidone (PVP) surface activator or surfactant has been used for complete stability of hybrid nanoparticles in lithium chloride (LiCl) desiccant solution and liquid water. By the experimental data, heat and mass transfer coefficients in the system have been determined in a relational way for different combinations of nanoparticles and adsorbents. The effect of important parameters such as air flow intensity and desiccant liquid, air temperature and humidity, temperature and composition of incoming desiccant liquid nanofluid on the efficiency of the system has been studied. And from there the exergy analysis of the system has been done. In this way, the best operating conditions for the better performance of the system containing liquid desiccant nanofluid have been determined. The results of this research have clearly shown that, changes in the air humidity and temperature have been increased by adding the hybrid nanoparticles to LiCl/H₂O liquid desiccant. In this regard, the mass transfer rate has been improved from ۳.۴۱% to ۲۸.۳% and the heat transfer rate has been improved from ۴.۱۸% to ۲۹.۱۱%. So, the average improvement has been ۲۳.۲۳% and ۲۲.۲۲%, respectively. Adding hybrid nanoparticles to LiCl/H₂O liquid desiccant has increased the mass transfer coefficient from ۱۷.۴۲% to ۲۹.۲۶% and the heat transfer coefficient from ۱۹.۸۳% to ۳۳.۵۵%. Therefore, according to these results, the average value of improvement in mass and heat transfer coefficients has been about ۲۲.۷۳% and ۲۶.۵۱%, respectively

کلمات کلیدی:

Nano Liquid Desiccant, Nanofluid, Absorption, Dehumidification, Heat transfer

لینک ثابت مقاله در پایگاه سیویلیکا:

<https://civilica.com/doc/2072236>

