

An innovative combined double-way chemisorption refrigeration cycle based on adsorption and desorption processes is presented. Two different reactive salts were used as sorbents and ammonia was utilized as the refrigerant in the proposed cycle. The useful cold was obtained from the evaporation heat of the refrigerant during the adsorption process and from the reaction heat of the low-temperature salt during the desorption process. The proposed combined double-way cycle has a distinct advantage of higher coefficient of performance (COP) in comparison with conventional adsorption cycle or desorption cycle. Experimental verification indicated that the advanced combined double-way cycle is feasible for refrigeration application, and the ideal COP of the basic cycle was about 1.24. Theoretical results showed that the proposed combined double-way cycle could improve COP by 167% and 60% when compared with conventional adsorption cycle and desorption cycle, respectively.