

Recent trends in liquid desiccant materials and cooling systems : application, performance and regeneration characteristics

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ABSTRACT

Air conditioners (ACs) use an enormous amount of energy as they are widely used to provide people with favorable indoor conditions. In recent years, liquid desiccants have received considerable attention as they can reduce the energy consumption of ACs in particular. This paper examines the different liquid desiccant materials, properties, operating conditions, desiccant dehumidifiers, performance improvements with different regeneration configurations. The paper also highlights the effect of the liquid desiccant system on indoor air quality and, more specifically, on volatile organic carbon, particulate matter, and the removal of bacteria. Besides, key performance parameters are introduced in order to understand the performance of liquid desiccant better. The operation of different materials or mixtures of liquid desiccants can be effectively compared with these parameters. Finally, various methods of liquid desiccant regeneration, including the most advanced method of photovoltaic/electrodialysis regeneration, are elucidated. The review could provide a suitable guidance for design and operation of a liquid desiccant-based building air conditioning system.

KEYWORDS

Liquid desiccant; Performance; Indoor air quality; Regeneration; Solar regenerator

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