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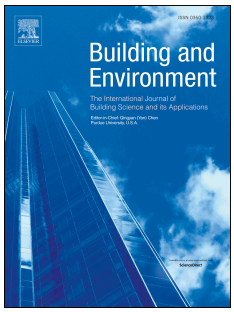

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Abstract: Liquid desiccant (LD) systems are an efficient method for humidity control. Moreover, LD systems also function to purify the air and remove volatile organic compounds such as formaldehyde. This study aims to analyze the performance of a LD system for formaldehyde removal from indoor air while simultaneously considering air dehumidification requirements. A theoretical model is proposed to predict the formaldehyde removal efficiency ($\varepsilon_{formaldehyde}$) of the LD system with various flow mediums, such as an air-LiBr solution, air-LiCl solution, and air-$CaCl_2$ solution. Prior to assessing the LD system performance with the model, Henry's law constants (HLCs) of formaldehyde in the three solutions are tested at the salt concentration range of 30-50 wt% and at the temperature range of 10-50 °C. Based on the results, the correlation equation of the HLC's temperature dependence are given, and then adopted for the simulation model. The effects of the number of mass transfer units of formaldehyde (NTU_{mf}), formaldehyde concentration in the return air, solution flow rate, and airflow rate on system performance are investigated and compared with various flow mediums. The results indicate that NTU_{mf} is a key factor influencing the $\varepsilon_{formaldehyde}$. However, the NTU_{mf} do not influence the dehumidification performance of the LD system. Both the $\varepsilon_{formaldehyde}$ and dehumidification performance remain unchanged with the increase of formaldehyde concentration in the return air. Both the $\varepsilon_{formaldehyde}$ and dehumidification

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