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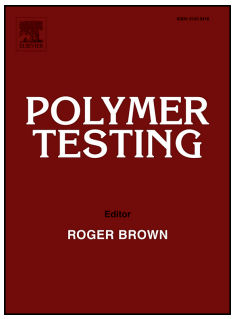

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Sorption and Regeneration Performance of Novel Solid Desiccant Based On PVA-LiCl Electrospun Nanofibrous Membrane

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Abstract: Electrospun PVA (polyvinyl alcohol)-LiCl composite membranes were prepared as novel solid desiccants. Experimental results show that nanofibrous membranes (NFMs) exhibit notable advantages in sorption capacity, sorption rate and low-temperature desorption rate, as compared with the solution-cast PVA-LiCl membranes (SCMs). The PVA NFM with 15 wt% LiCl can sorb 1.04 g g^{-1} water at 25□ and 90% relative humidity (RH), which is more than twice of the reported capacity of silica gel. Due to the nano-structure and small diffusion distance, the desiccant membranes have fast sorption and desorption rates. The desorption isobars show that about 90% of the sorbed moisture can be removed at temperatures between 40℃ and 60℃, which makes it promising to utilize solar energy or exhaust heat for air dehumidification. The composite desiccant membranes can also be recycled without the degradation of sorption and desorption performance.

Keywords: Polymeric membrane; Electrospinning; Relative humidity; Water sorption; Diffusion; Low-temperature regeneration.

1. Introduction

Humidity is an important factor in our daily life, and should be controlled in

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