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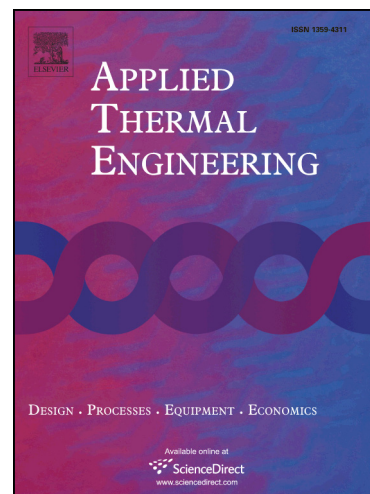
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## Water Vapor Sorption Kinetics of Polymer Based Sorbents: Theory and Experiments

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### Abstract

Water vapor sorption kinetics of two polymer based sorbents has been experimentally measured at adsorption temperatures of 20, 30, 50, 70 and 80 °C using a magnetic suspension adsorption measurement unit. The experimental data is employed to commonly known adsorption kinetics approximations i.e. Linear driving force (LDF) model, Fickian diffusion (FD) model, and Semi-infinite model. All these models could not approximate the adsorption kinetics of polymer based sorbents, however, the LDF model is modified which successfully predicts the experimental kinetics for short-time and long-time estimation. For both sorbents, the diffusion time constant has been calculated at each adsorption temperature, and consequently, activation energy and pre-exponential constant are found from Arrhenius plot. The variation of diffusion time constant with relative pressure and adsorption temperature is discussed in relation with typical behavior of polymer/water pairs.

**Keywords:** adsorption kinetics; polymer sorbents; water vapors; kinetic models; swelling

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