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DYNAMICS OF WATER ADSORPTION ON LOOSE GRAINS OF AQSOA™-FAM-Z02: A MULTI-LAYER CONFIGURATION

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Abstract

This paper addresses the optimization of dynamic performance of adsorptive chillers (ACs) utilizing loose grains of commercial adsorbent AQSOA™-FAM-Z02. The dynamic data were measured by a Volumetric Large Temperature Jump method under typical conditions of isobaric ad/desorption stages of real AC cycle. *N* flat layers of the loose adsorbent grains were placed on a metal support and subjected to a temperature jump/drop. The effects of number of the adsorbent layers (N = 2, 4, and 8), and the grain size (0.2–0.9 mm) were studied. The most notable observations are: 1) the initial part of all kinetic curves is exponential and can be described by a single characteristic time τ; 2) at equal values of the ratio (S/m) = (heat transfer surface)/(adsorbent mass) the dynamic curves are very close regardless the adsorbent grain size R; 3) the maximal specific power W_{max} is a linear function of the (S/m)-ratio: $W_{max} = A\cdot(S/m)$. Appropriate recommendations on improving the AC cycle dynamics that concern the optimal conversion degree, grain size and (S/m)-ratio are made.