Modeling of Heat and Mass Transfer at Absorption Under the Conditions of Refrigerating Machine Operation

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The first part of this report deals with modeling the heat and mass transfer of vapor absorption by a solution flowing over the vertical row of horizontal tubes. To calculate heat and mass transfer characteristics at absorption on a tube bundle, two schemes are considered. The first scheme assumes that there is no absorption in-between the tubes and calculation for each tube is carried out using the formulas for the initial region and region with the linear temperature profile. The second scheme is based on the assumption that intensive absorption occurs in-between the tubes on the jets and droplets under the adiabatic conditions, when equilibrium is reached at small distances. The problems related to heat and mass transfer modeling at absorption by a solution with surfactants are considered in the second part of this report. Experimental data about surfactant effect on the local characteristics of heat and mass transfer at absorption is analyzed there. Possible mechanisms of this effect are revealed on the basis of experiments on steam absorption by water solution of lithium bromide with various surfactants. Dependences between interfacial tension and determining parameters are analyzed under the specific operation conditions of heat pump and refrigerator absorbers.