Answer on Question #79753 - Chemistry - Physical Chemistry

Question:

A stream of water vapor flowing at a rate of 250 mol/h is brought from 600 degrees Celsius and 10 bar to 100 degrees Celsius and 1 atm. Estimate the required cooling rate in kW using the following three methods:

a. steam tables

b. using specific heat capacity data

c. using specific enthalpy data

which of those answers should be the most accurate and why?

what is the physical significance of the difference between the values calculated with methods 1 and 2?

Solution:

You need both Cv and Cp for this and have to do it in more than one step
heat capacity [whether Cp or Cv] is not constant, ie, Cx = f(T)
Steam table should include specific enthalpy, but that could be calculated from U, P, & V.