Electronic Supplementary Material (ESI) for Physical Chemistry Chemical Physics.

Hydration enthalpies of amorphous sucrose, trehalose and maltodextrins and their relations to heat capacities

Supplementary Information

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Table S1. Results fitting for Glucidex9 fast scan rate

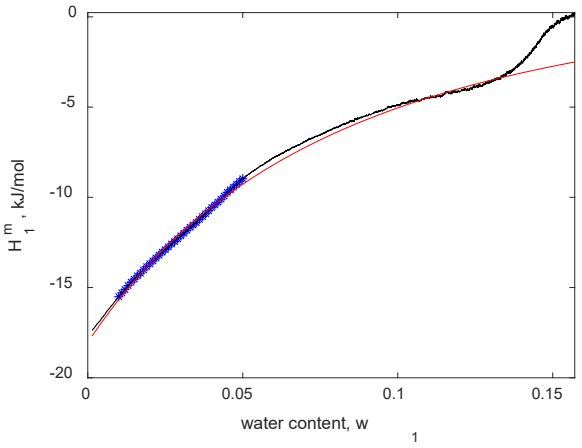
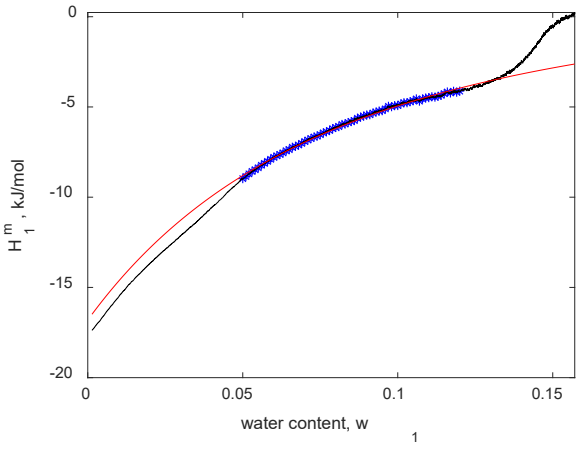
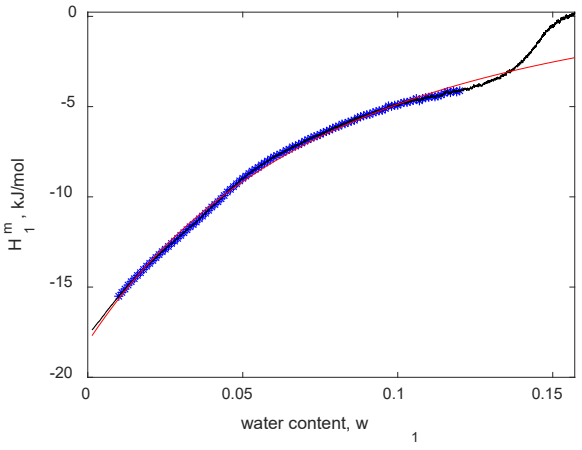
Range of data	Resulted fitting parameters	Results of fitting
w=0.010:0.001:0.05	Tg_2= 498.15 (fixed) ΔCp_1= 0.056924 ΔCp_2= 0.36732 k= 0.13 (fixed)	
w=0.05:0.001:0.12	Tg_2= 498.15 (fixed) ΔCp_1= -0.10978 ΔCp_2= 0.34626 k= 0.13 (fixed)	
w=0.01:0.001:0.12	Tg_2= 498.15 (fixed) ΔCp_1= -0.22755 ΔCp_2= 0.35303 k= 0.13 (fixed)	

Table S2. Results fitting for Glucidex9 slow scan rate

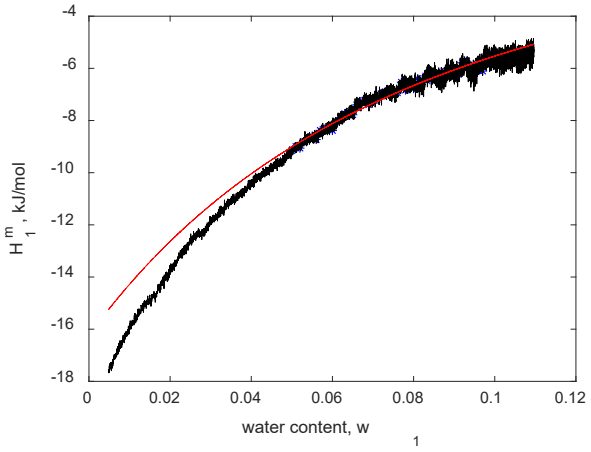
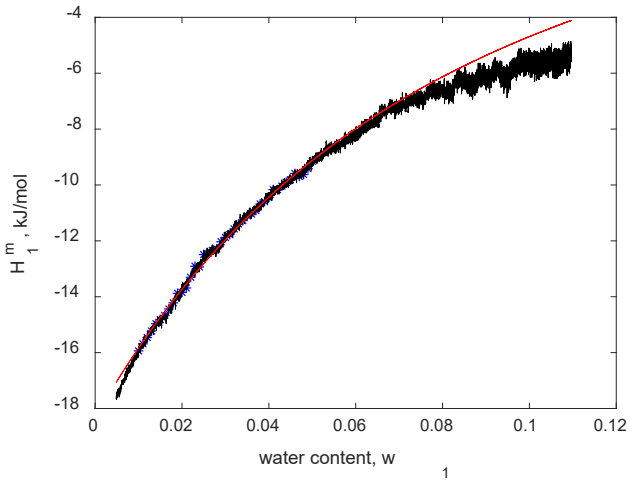
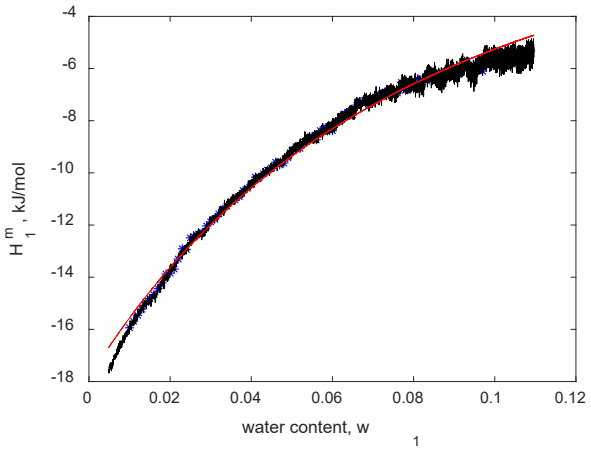
Range of data	Resulted fitting parameters	Results of fitting
w=0.05:0.001:0.10	Tg_2= 498.15 (fixed) ΔCp_1= 0.2915 ΔCp_2= 0.35977 k= 0.13(fixed)	
w=0.01:0.001:0.05	Tg_2= 498.15 (fixed) ΔCp_1= -0.15289 ΔCp_2= 0.35821 k= 0.13(fixed)	
w=0.01:0.001:0.10	Tg_2= 498.15(fixed) ΔCp_1= 0.025216 ΔCp_2= 0.36562 k= 0.13(fixed)	

Table S3. Results fitting for Glucidex12 fast scan rate

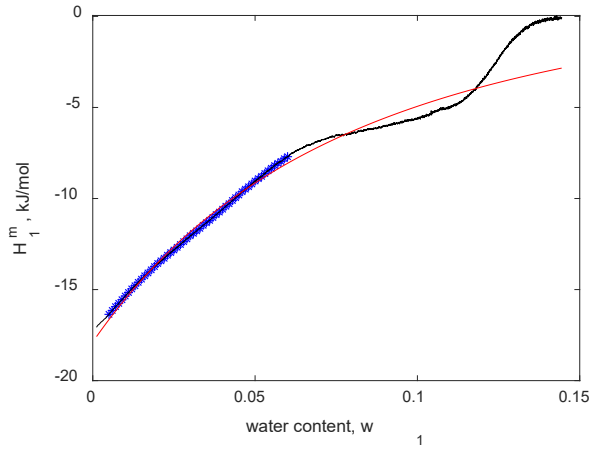
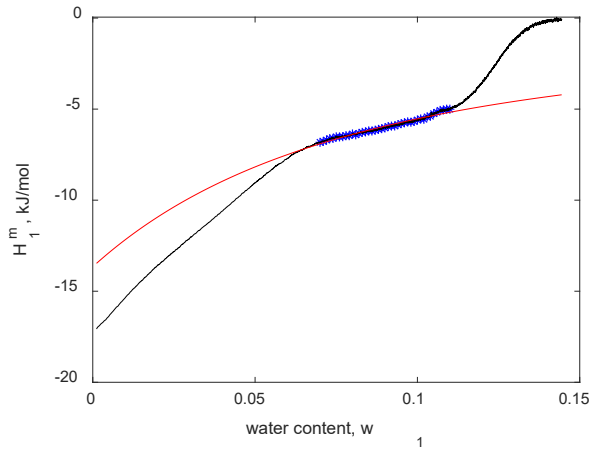
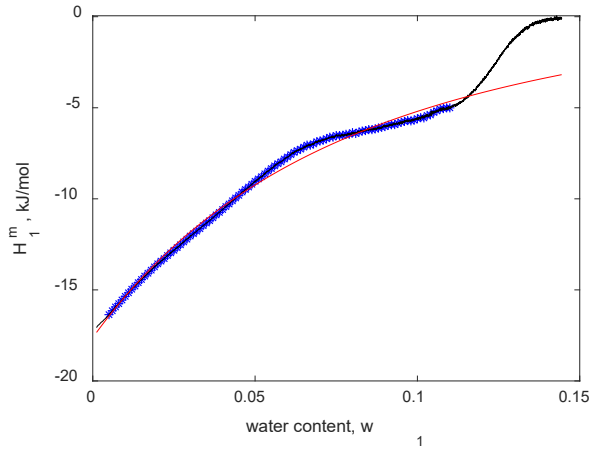
Range of data	Resulted fitting parameters	Results of fitting
w=0.005:0.001:0.06	Tg_2= 473.15 (fixed) ΔCp_1= -0.49191 ΔCp_2 = 0.40322 k= 0.15(fixed)	
w=0.07:0.001:0.11	Tg_2= 473.15 (fixed) ΔCp_1= 0.52361 ΔCp_2 = 0.37799 k= 0.15(fixed)	
w=0.005:0.001:0.11	Tg_2= 473.15 (fixed) ΔCp_1= -0.31551 ΔCp_2 = 0.41058 k= 0.15(fixed)	

Table S4. Results fitting for sucrose fast scan rate

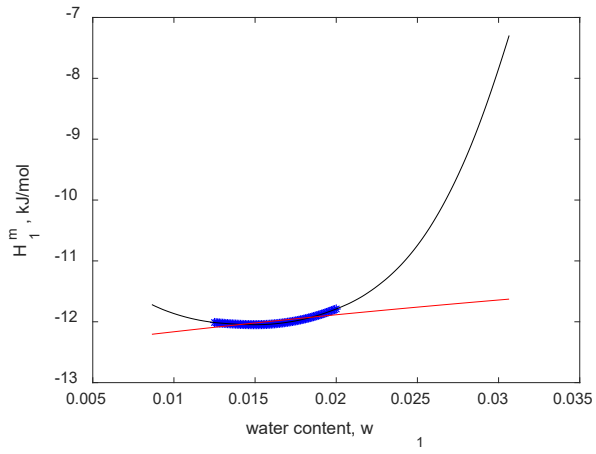
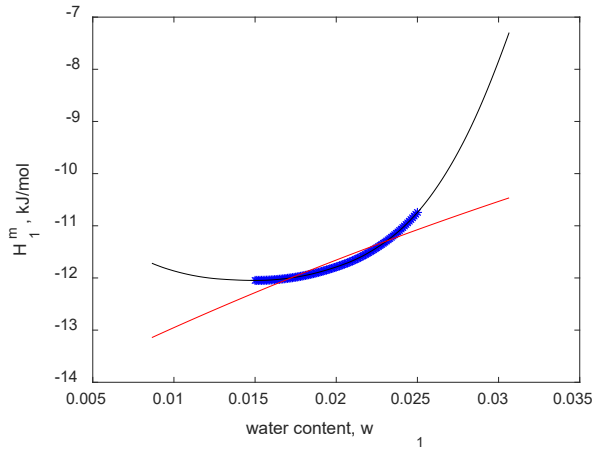
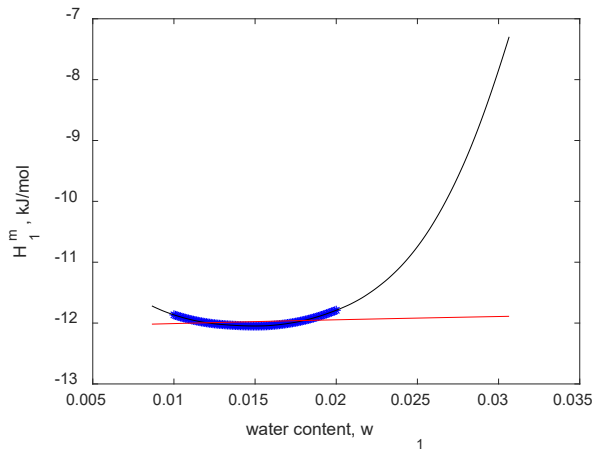
Range of data	Resulted fitting parameters	Results of fitting
w=0.0125:0.0001:0.02	Tg_2= 343 (fixed) ΔCp_1= 3.2405 ΔCp_2 = 0.69599 k= 0.1718(fixed)	
w=0.015:0.0001:0.025	Tg_2= 343(fixed) ΔCp_1= 0.15834 ΔCp_2 = 0.67238 k= 0.1718(fixed)	
w=0.01:0.0001:0.02	Tg_2= 343(fixed) ΔCp_1= 3.908 ΔCp_2 = 0.7018 k= 0.1718(fixed)	

Table S5. Results fitting for sucrose slow scan rate

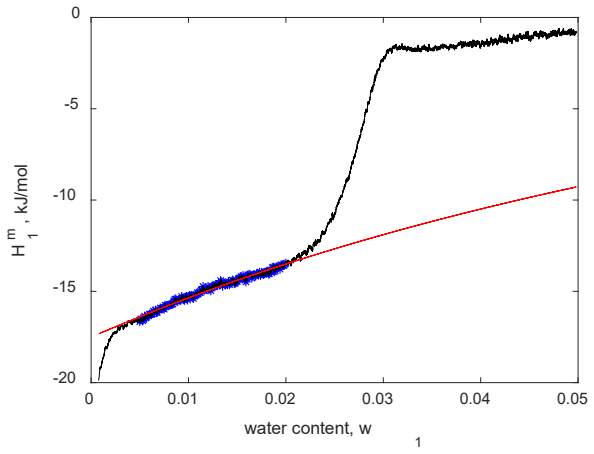
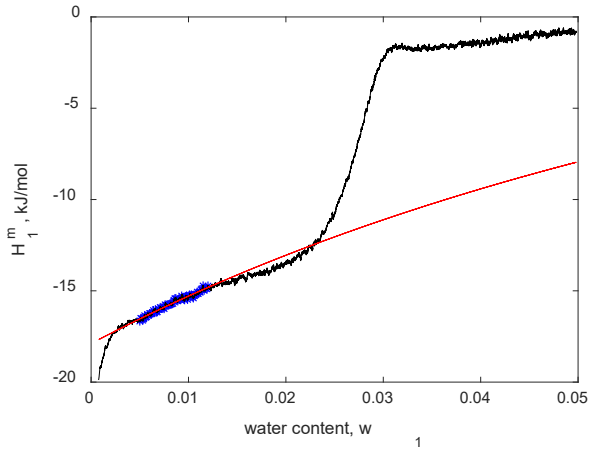
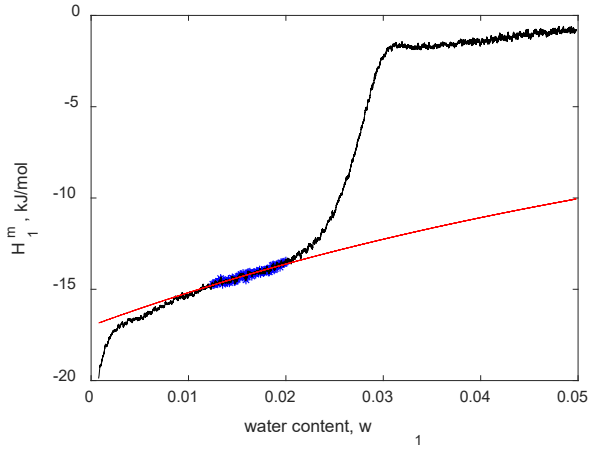
Range of data	Resulted fitting parameters	Results of fitting
w=0.005:0.0001:0.0	Tg_2= 343(fixed) ΔCp_1= -0.82376 ΔCp_2 = 0.77599 k= 0.1718(fixed)	
w=0.005:0.0001:0.012	Tg_2= 343(fixed) ΔCp_1= -1.9828 ΔCp_2 = 0.74873 k= 0.1718(fixed)	
w=0.0125:0.0001:0.02;	Tg_2= 343(fixed) ΔCp_1= 0.062949 ΔCp_2 = 0.78542 k= 0.1718(fixed)	

Table S6. Results fitting for trehalose slow scan rate

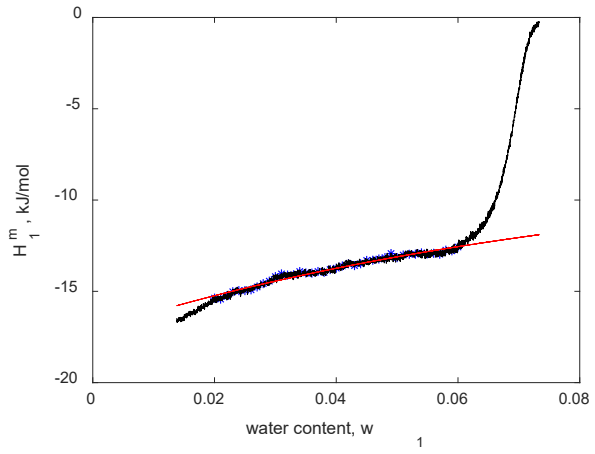
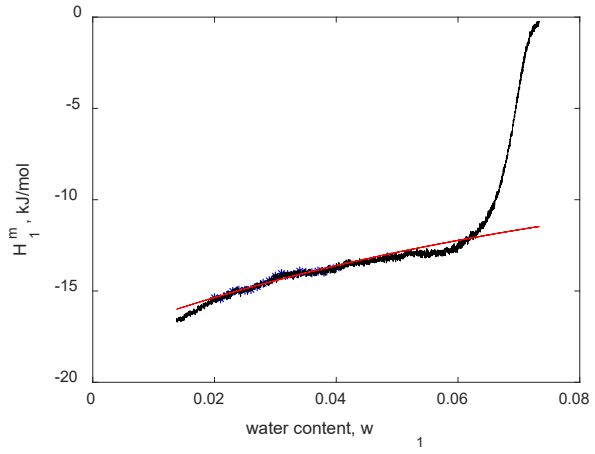
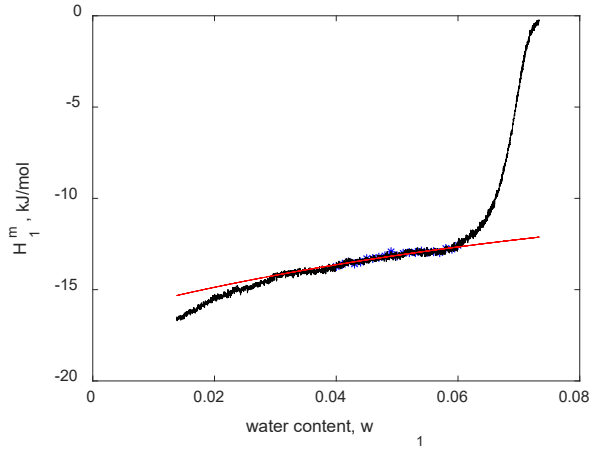
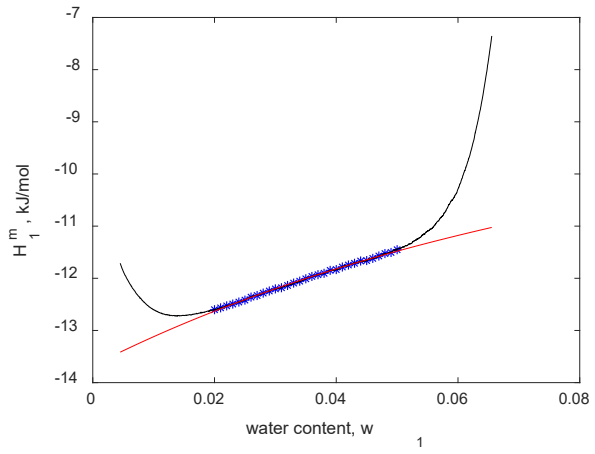
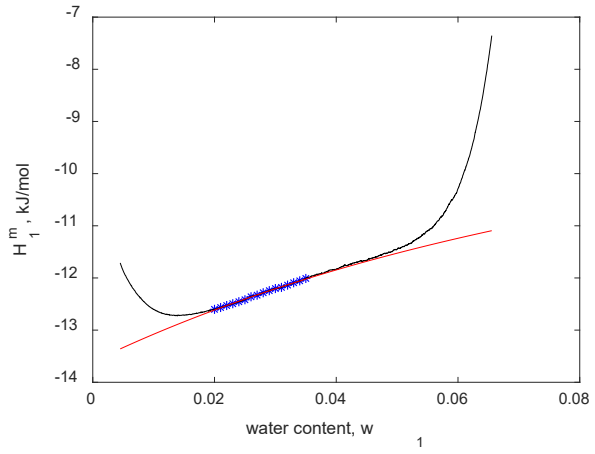
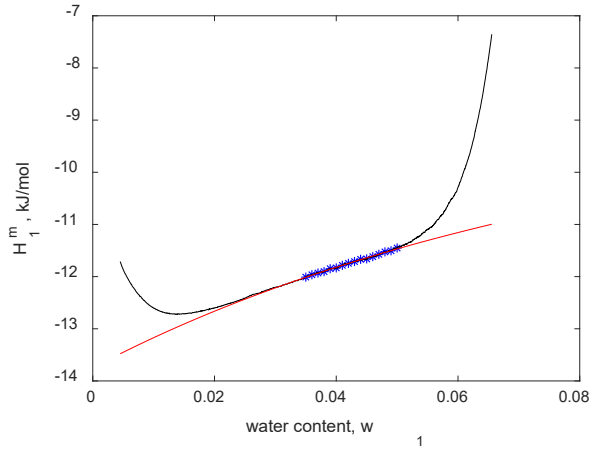
Range of data	Resulted fitting parameters	Results of fitting
w=0.02:0.001:0.06	Tg_2= 393.15(fixed) ΔCp_1= 2.2527 ΔCp_2 = 0.87291 k= 0.1923(fixed)	
w=0.02:0.001:0.04	Tg_2= 393.15 (fixed) ΔCp_1= 1.8043 ΔCp_2 = 0.85932 k= 0.1923(fixed)	
w=0.04:0.001:0.06;	Tg_2= 393.15 (fixed) ΔCp_1= 2.6533 ΔCp_2 = 0.87185 k= 0.1923 (fixed)	

Table S7. Results fitting for trehalose fast scan rate

Range of data	Resulted fitting parameters	Results of fitting
w=0.02:0.001:0.050	Tg_2= 393.15 (fixed) ΔCp_1= 2.7218 ΔCp_2 = 0.76109 k= 0.1923(fixed)	
w=0.02:0.001:0.035	Tg_2= 393.15 (fixed) ΔCp_1= 2.8006 ΔCp_2 = 0.76379 k= 0.1923(fixed)	
w=0.035:0.001:0.05	Tg_2= 393.15 (fixed) ΔCp_1= 2.6716 ΔCp_2 = 0.76056 k= 0.1923(fixed)	

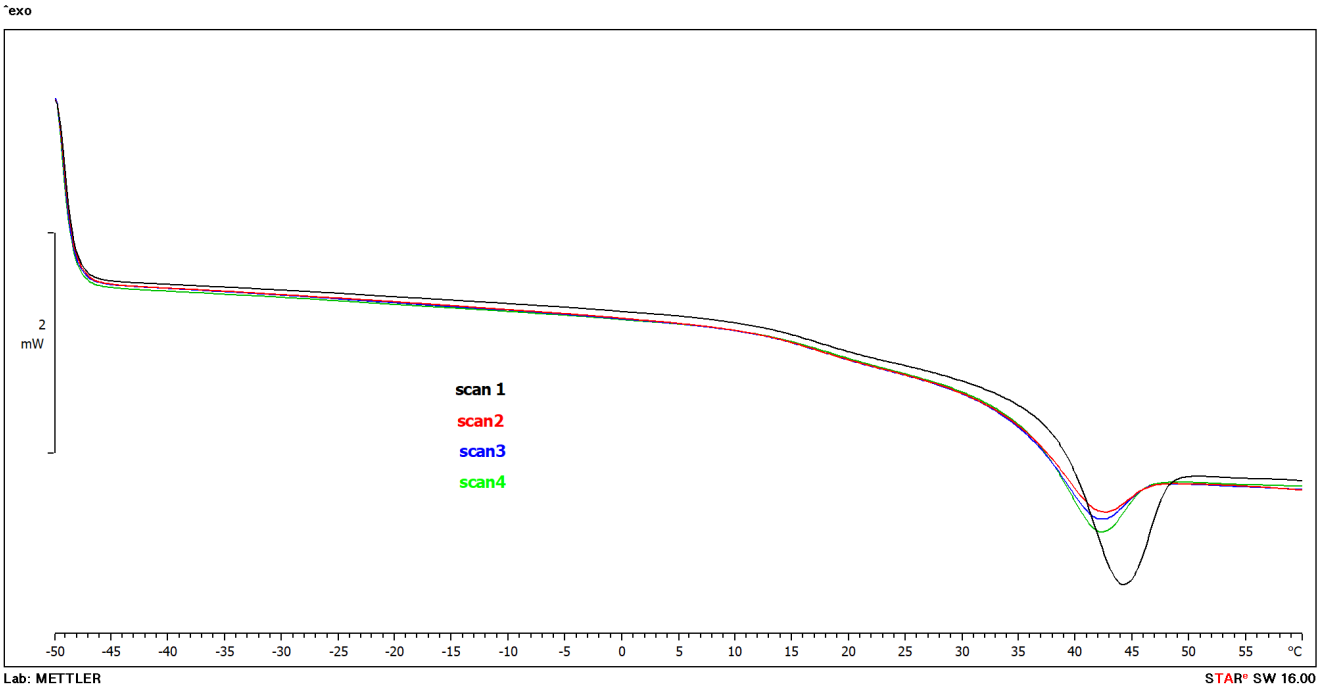


Figure S1. DSC thermograms of 4 scans sucrose-water (2.5 wt%)sample obtained by freeze-drying. Scan 1 –balck colour, scan 2 – red, scan 3 – blue, scan 4 – green.

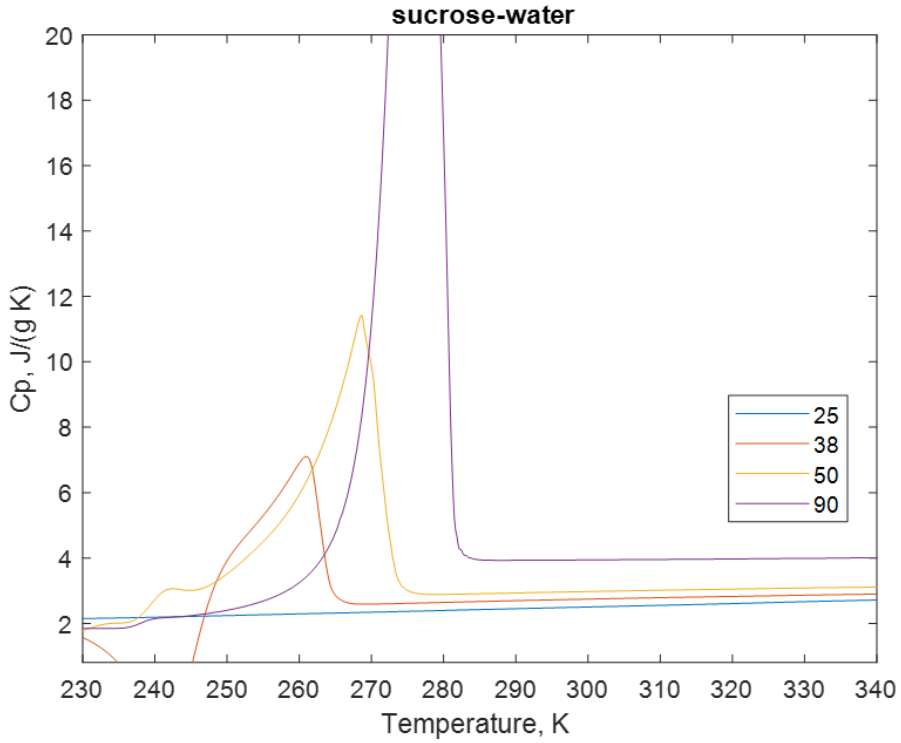


Figure S2. Heat capacities of sucrose-water system. Different colours correspond with different water content.

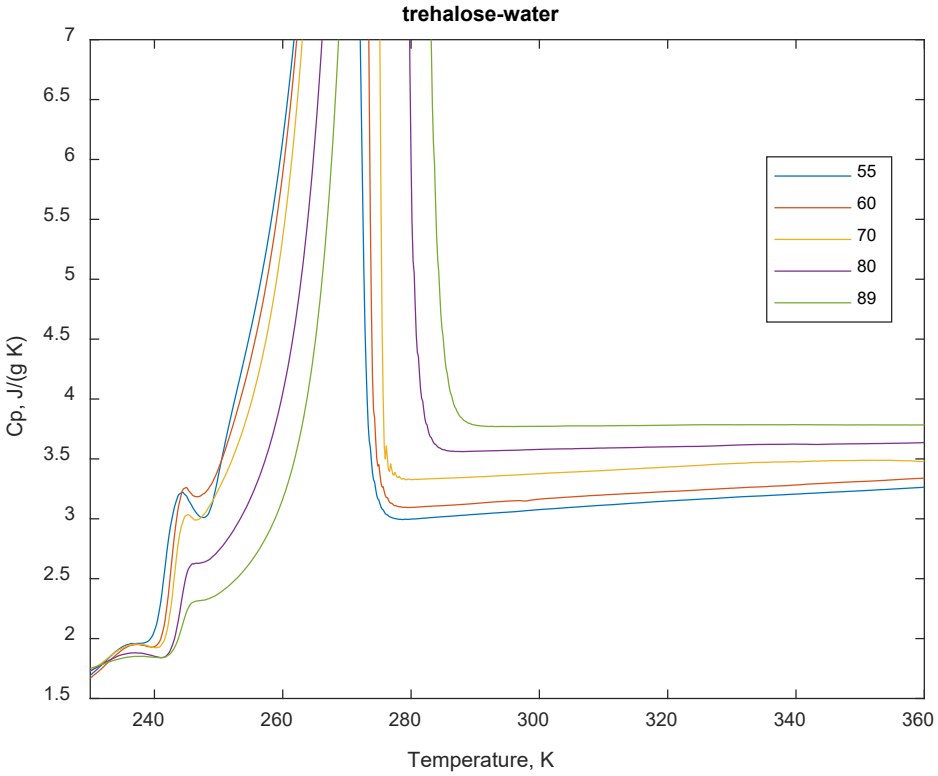


Figure S3. Heat capacities of trehalose-water system. Different colours correspond with different water content.

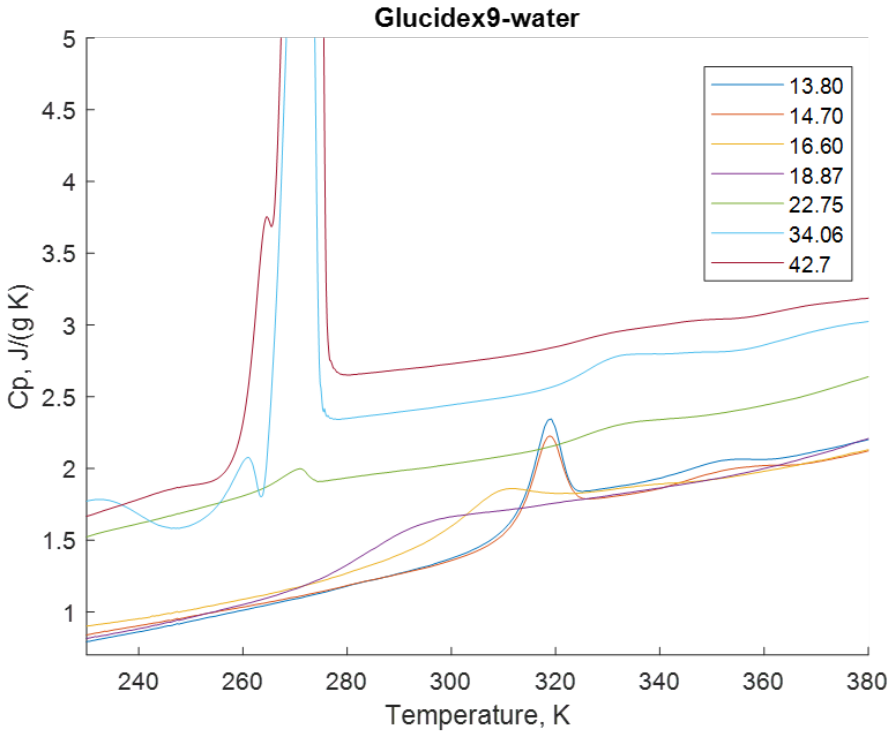


Figure S4. Heat capacities of Glucidex9-water system. Different colours correspond with different water content (13.8-42.7 wt %).

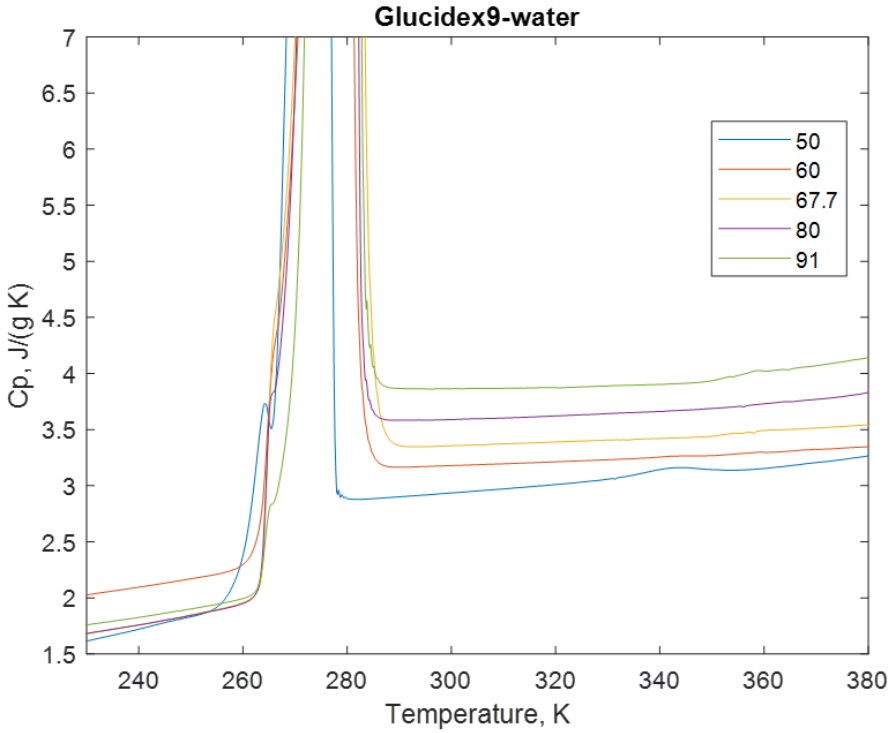


Figure S5. Heat capacities of Glucidex9-water system. Different colours correspond with different water content (50-91 wt %).

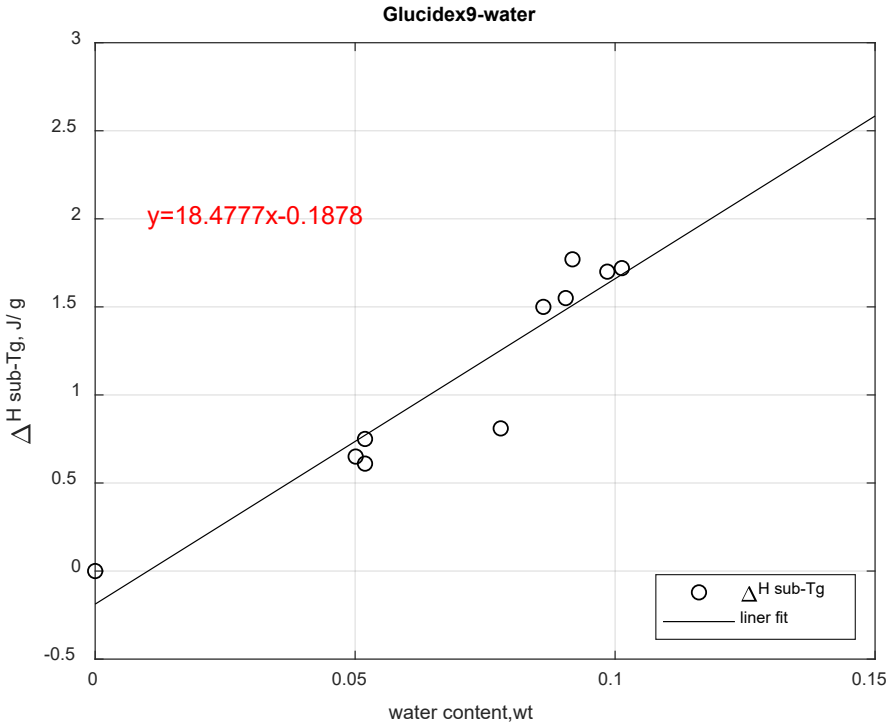


Figure S6. The enthalpy of sub-Tg transition dependence on water content for Glucidex9-water system.

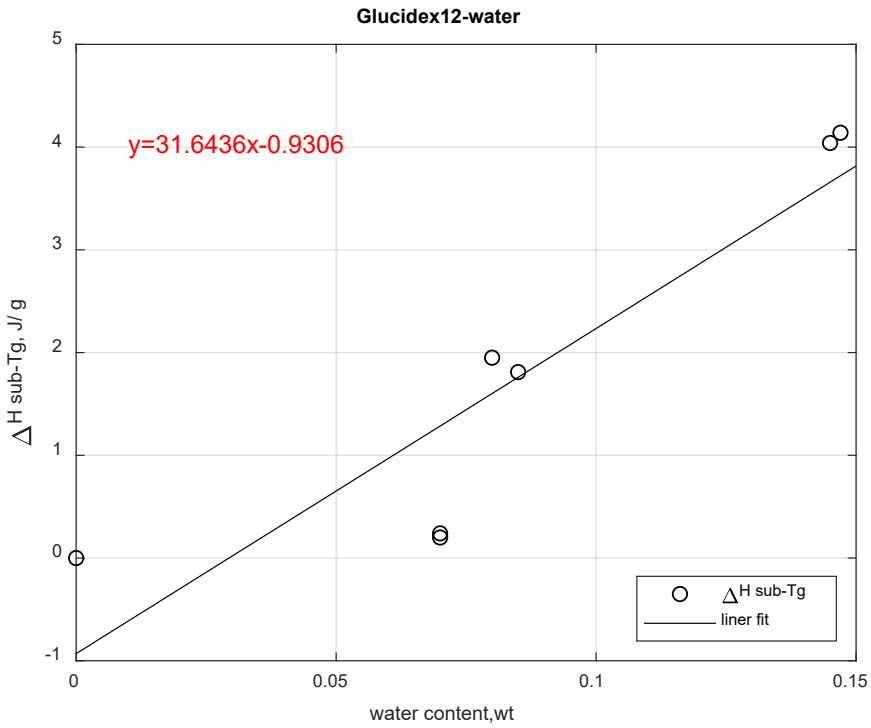


Figure S7. The enthalpy of sub-Tg transition dependence on water content for Glucidex12-water system.