Experimental 4: Heat of Neutralization

A. Heat Capacity of Calorimeter

   Assuming: heat capacity of calorimeter is zero !!!

B. Heat of Neutralization of HCl+ NaOH

	1.0 M NaOH, 50 mL	1.0 M HCl, 50 mL
Temperature before mixing	22°C	22°C
Average (T_i)	22°C	
Temperature after reaction (T_f)	32 °C	
Calculate Heat of Neutralization	1.0 x .05 = .05 mol (for both NaOH and HCL) 50 + 50 = 100ml Q = mc triangle (change of temp) t = 100ml x 4.184j x 32 degrees Celsius = 13,388.8 j = 13.39 kj Change of heat = -q/mol = -13.39 kj/.05mol = -267.8 kj/mol	

C. Heat of Neutralization of CH_3COOH+NaOH

	1.0 M NaOH, 50 mL	1.0 M CH$_3$COOH, 50 mL
Temperature before mixing	22 °C	21.5 °C
Average (T_i)	22 °C	
Temperature after reaction (T_f)	27 °C	
Calculate Heat of Neutralization	1.0 x 0.05 = .05mol (for both NaOH and CH3COOH) 50 + 50= 100ml, q = mc triangle (change of temp) t =100ml x 4.184j x 27 degrees Celsius = 11,296.8 j = 11.30 kj, change of temp = (-q/mol) -11.30kj /.05mol = -226 kj/mol	

D. Compare part B and C, discuss the results

Part B had a constant temperature which resulted in 32 degrees Celsius. After calculations, you get change of heat being equaled to -267.8 kj/mol and as for part c, it did not have a constant temperature (21.5 degrees Celsius), which changed the "Tf" (final temperature). It resulted in the change of heat being -226 kj/mol. Overall, part C was a little greater than part B.

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