

Thermo. Titr. Application Note No. H-065

Title:	Determination of Salts of Carboxylic Acids by Aqueous Acidometric Titration
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Scope:	Determination of sodium and potassium salts of carboxylic acids in aqueous media. May be used for analysis of reagent purity.
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Principle:	<p>Water-soluble sodium or potassium salts of carboxylic acids (RCO_2^-) may be determined in aqueous media by thermometric titration with standard hydrochloric acid. Sulfate ion is employed as a thermochemical indicator. The reaction enthalpy of such salts of weak acids is very low, and inflections in the titration temperature curve are slight. These inflections may be enhanced by the addition of sulfate ion. Sulfate is a much weaker base than RCO_2^-, and has a relatively large endothermic heat of protonation (+19.7kJ/mol).</p> <p>Reference: J. Christensen et al., <i>Experiments in thermometric titrimetry and titration calorimetry</i>. Brigham Young University (1974)</p>
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Reagents:	<i>Titant:</i> 2mol/L HCl
	<i>Thermochemical indicator:</i> 10g/100mL Na_2SO_4 solution

Method:	Basic Experimental Parameters:	
	Titrant delivery rate (mL/min.)	4
	No. of exothermic endpoints	1
	Data smoothing factor (DSF)	45
	Stirring speed (802 stirrer)	10
<p><i>Sample preparation:</i> Weigh or pipette sample containing approximately 10mmole RCO₂Na or RCO₂K (for example, ~1.4g sodium acetate) into a titration vessel. Pipette 2mL of sulfate indicator solution, and make to approximately 30mL with DI water.</p>		

Examples:	Sodium acetate trihydrate, BDH Analar, FW=136.08
<p><i>Note: Reagent bottle had been open for some years, and contents had clumped</i></p>	CH ₃ CO ₂ Na=98.93±0.04%, n=7

Calculations:	$\%CH_3CO_2Na = \frac{((\text{Titre, mL} - \text{blank, mL}) \times \text{HCl mol/L} \times 136.08 \times 100)}{(\text{sample mass, g} \times 1000)}$
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