

## 1 Nonproprietary Names

BP: Glacial Acetic Acid  
 JP: Glacial Acetic Acid  
 PhEur: Acetic Acid, Glacial  
 USP–NF: Glacial Acetic Acid

## 2 Synonyms

Acidum aceticum glaciale; E260; ethanoic acid; ethylic acid; methane carboxylic acid; vinegar acid.

See also Section 17 and Section 18.

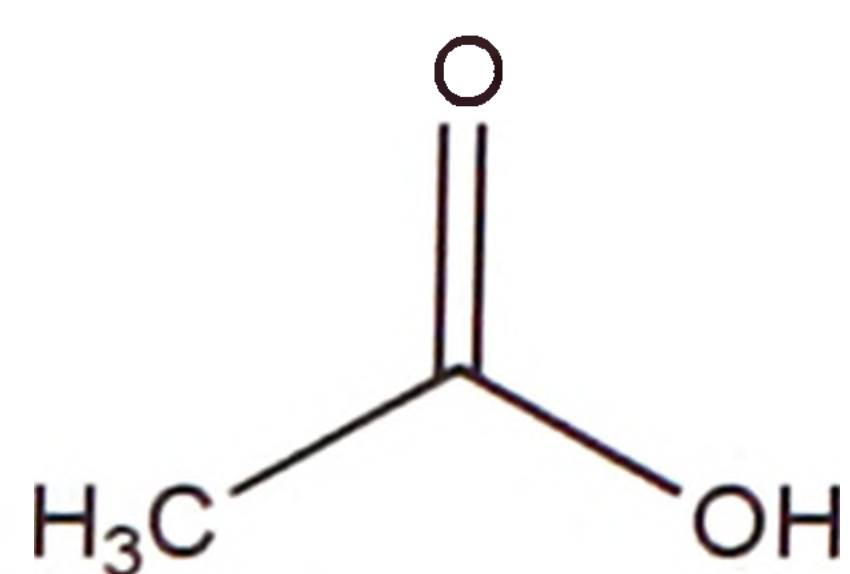
## 3 Chemical Name and CAS Registry Number

Ethanoic acid [64-19-7]

## 4 Empirical Formula and Molecular Weight

$C_2H_4O_2$  60.05

## 5 Structural Formula



## 6 Functional Category

Acidulant; buffering agent.

## 7 Applications in Pharmaceutical Formulations or Technology

Glacial and diluted acetic acid solutions are widely used as acidulants in a variety of pharmaceutical formulations and food preparations. Acetic acid is used in pharmaceutical products as a buffer system when combined with an acetate salt such as sodium acetate.

## 8 Description

Glacial acetic acid occurs as a crystalline mass or a clear, colorless volatile solution with a pungent odor.

## 9 Pharmacopeial Specifications

See Table I.

**Table I:** Pharmacopeial specifications for glacial acetic acid.

Test	JP XVII	PhEur 9.2	USP 40–NF 35 S1
Identification	+	+	+
Characters	+	+	–
Freezing point	$\geq 14.5^\circ\text{C}$	$\geq 14.8^\circ\text{C}$	$\geq 15.6^\circ\text{C}$
Nonvolatile matter	$\leq 1.0\text{ mg}$	$\leq 0.01\%$	$\leq 1.0\text{ mg}$
Sulfate	+	+	+
Chloride	+	+	+
Heavy metals	$\leq 10\text{ ppm}$	–	$\leq 5\text{ ppm}$
Iron	–	$\leq 5\text{ ppm}$	–
Readily oxidizable impurities	+	+	+
Assay	$\geq 99.0\%$	99.5–100.5%	99.5–100.5%

## 10 Typical Properties

### Acidity/alkalinity

pH = 2.4 (1 M aqueous solution);  
 pH = 2.9 (0.1 M aqueous solution);  
 pH = 3.4 (0.01 M aqueous solution).

**Boiling point**  $118^\circ\text{C}$

**Dissociation constant**  $pK_a = 4.76$

**Flash point**  $39^\circ\text{C}$  (closed cup);  $57^\circ\text{C}$  (open cup).

**Melting point**  $17^\circ\text{C}$

**Refractive index**  $n_D^{20} = 1.3718$

**Solubility** Miscible with ethanol, ether, glycerin, water, and other fixed and volatile oils.

**Specific gravity** 1.045

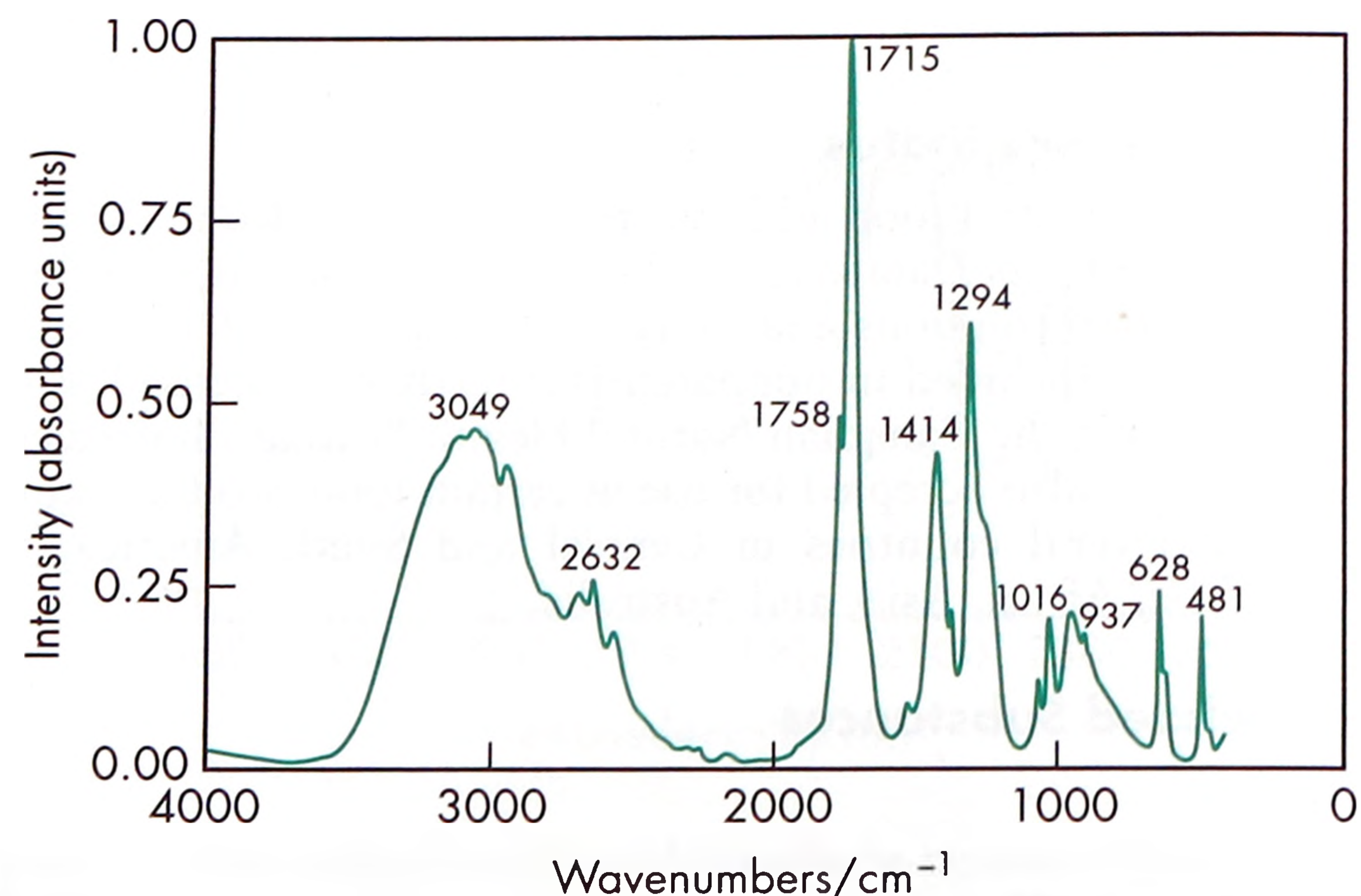
### Spectroscopy

IR spectrum see Figure 1.

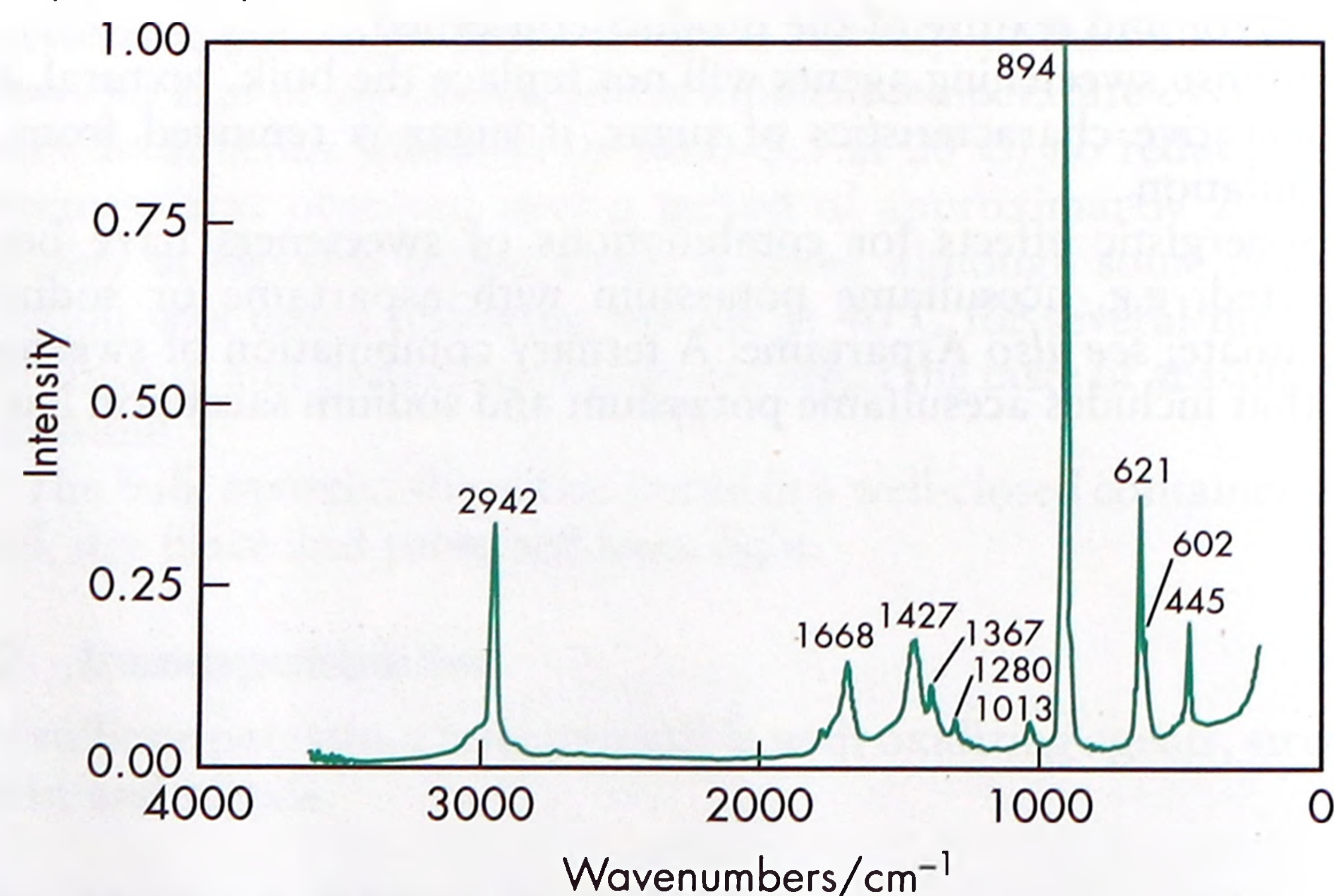
Raman spectrum see Figure 2.

## 11 Stability and Storage Conditions

Acetic acid should be stored in an airtight container in a cool, dry place.



**Figure 1:** Infrared spectrum of acetic acid measured by transmission. Adapted with permission of Informa Healthcare.



**Figure 2:** Raman spectrum of acetic acid measured in the  $180^\circ$  reflectance mode. Adapted with permission of Informa Healthcare.