
# ENGINEERING CHEMISTRY

Department of Science and Humanities

# ENGINEERING CHEMISTRY

## Module I- Molecular Spectroscopy

***Class content:***

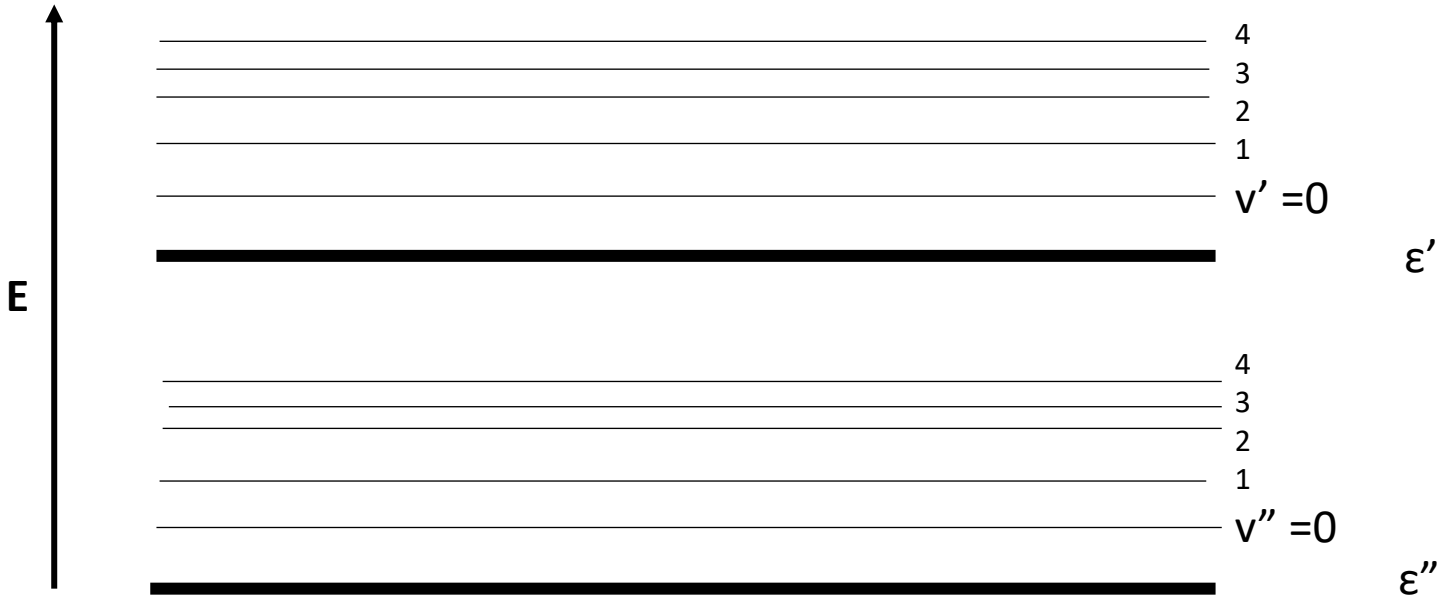
- ***Vibrational coarse structure-Progressions***

# ENGINEERING CHEMISTRY

## Module I- Molecular Spectroscopy

### Vibrational Coarse structure

- The **ground state** energy levels are denoted by Ɛ” and v”, while the **excited state** energy levels are denoted by Ɛ’ and v’
- There are **no selection rules** for vibrational transitions during electronic transition



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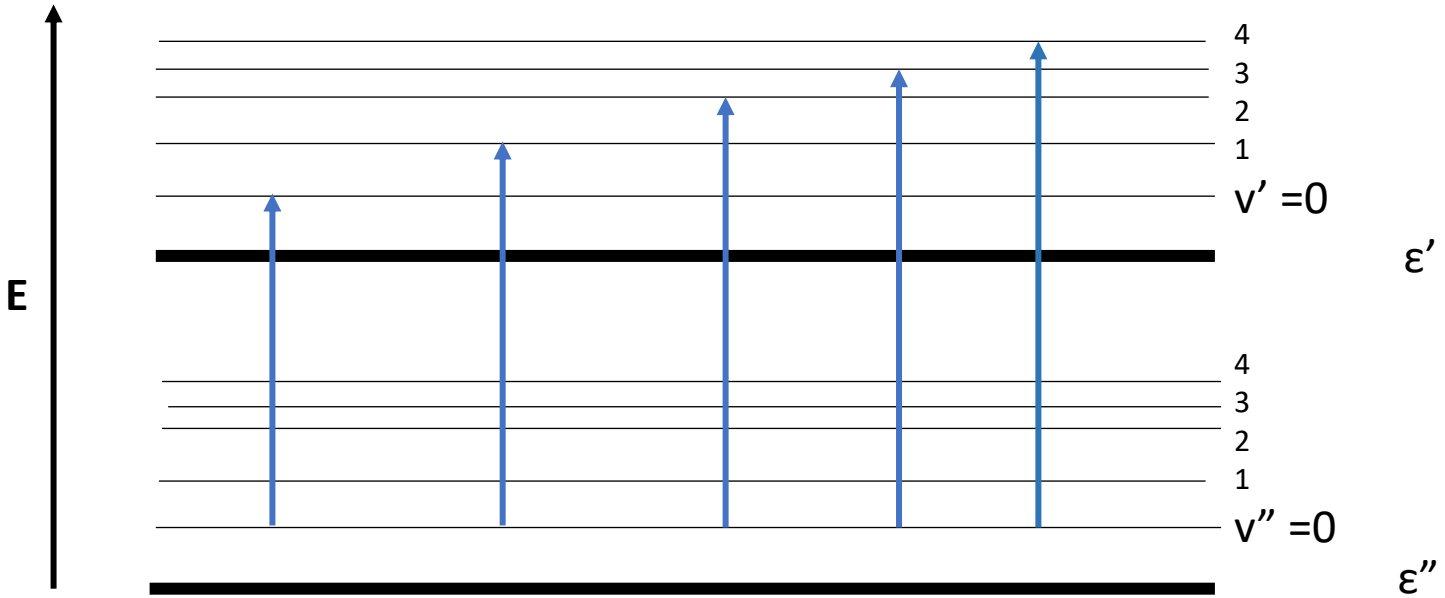
## Module I- Molecular Spectroscopy

Most of the transitions start from **v”=0** as it is the most populated level



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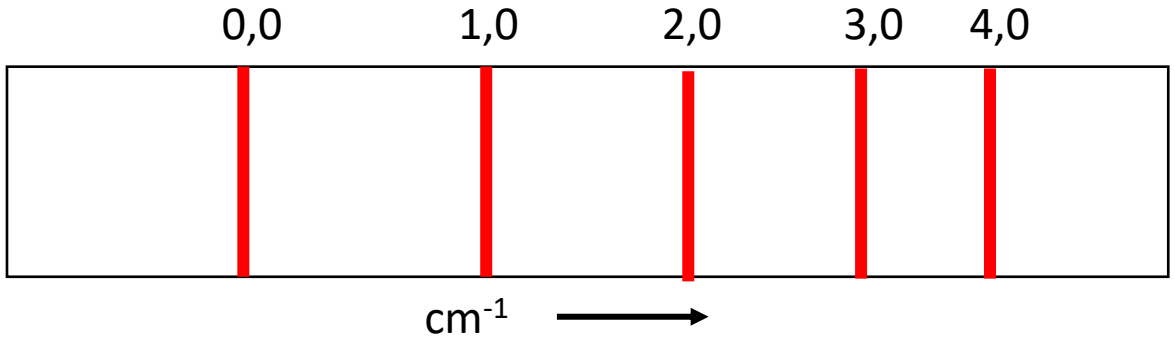
## Module I- Molecular Spectroscopy

- The lines in the resulting spectrum are denoted by **(v',v")**
- The resulting spectrum is called **progression**
- The lines **converge** at higher energy levels showing **anharmonicity** in the excited electronic state

### Spectrum showing Progression



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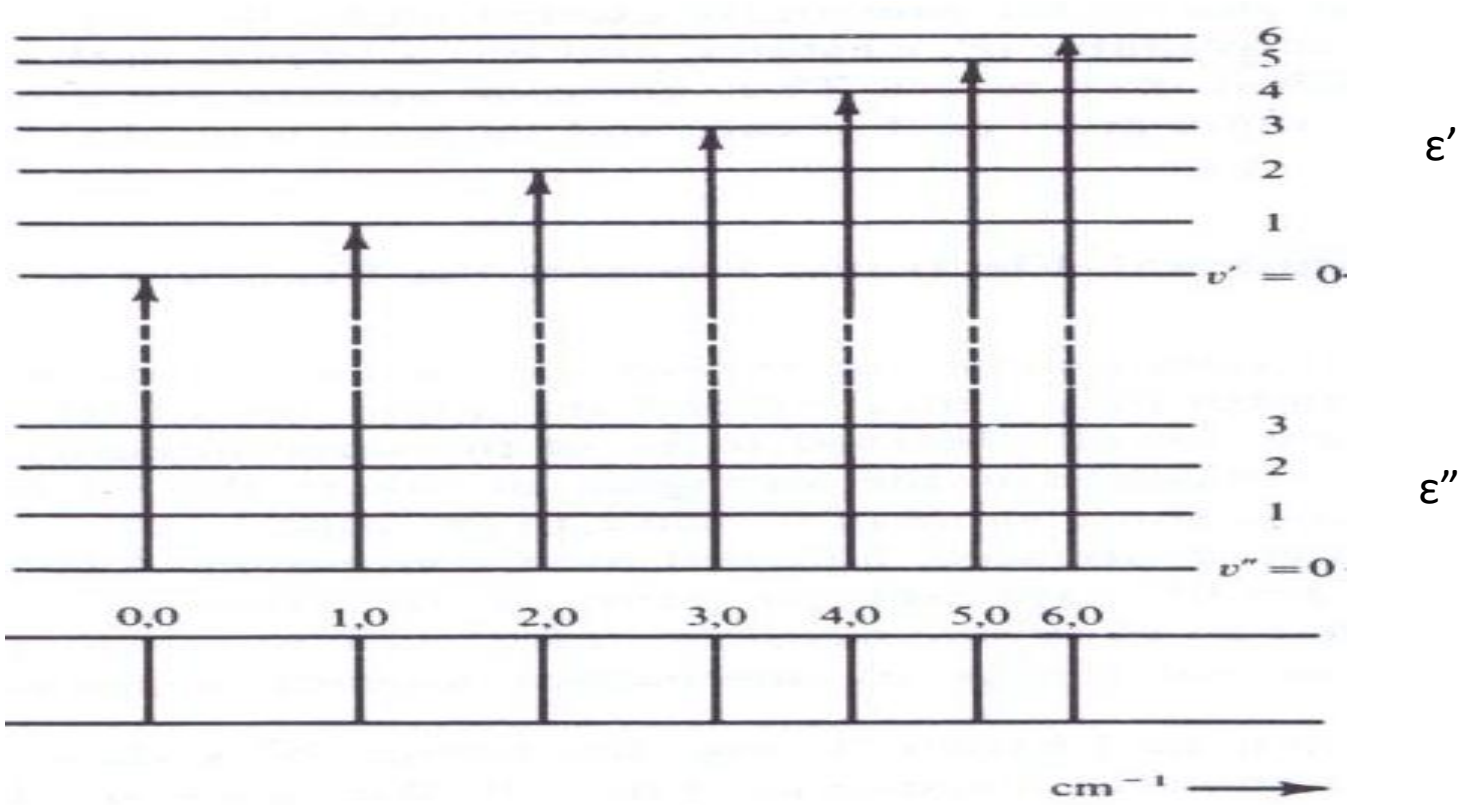
## Module I- Molecular Spectroscopy

**Vibrational 'coarse structure' during electronic transition**




ε'

ε''

Source: Fundamentals of Molecular Spectroscopy: C. N. Banwell and Elaine M McCash, Fifth Edition, MCGRAW-HILL Education (India) Private Ltd.


# THANK YOU

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