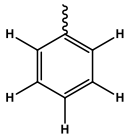
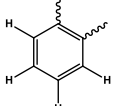
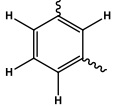
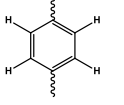
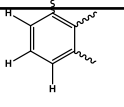
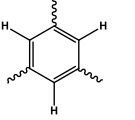


Aromatic Ring Substitution

orto- meta- para-

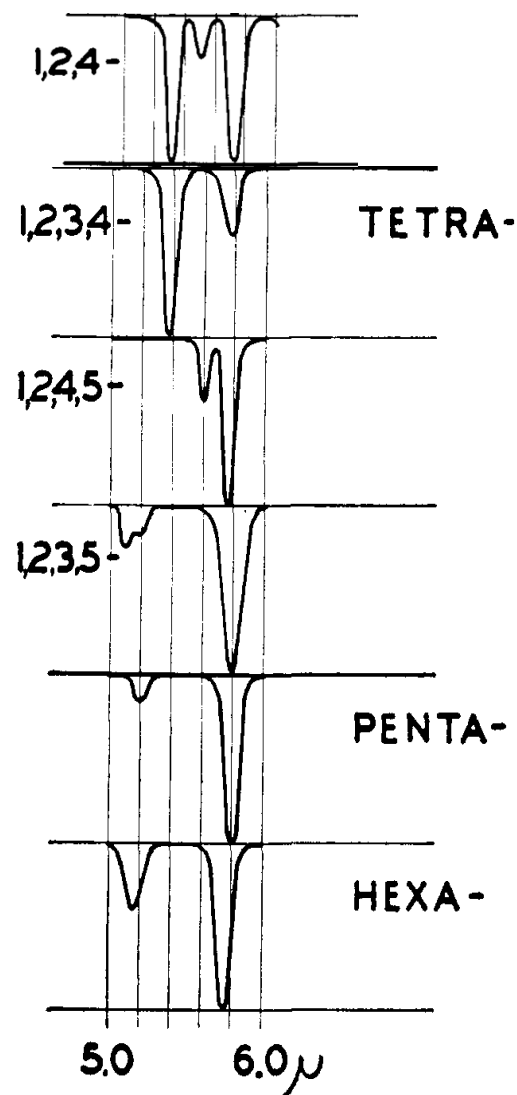
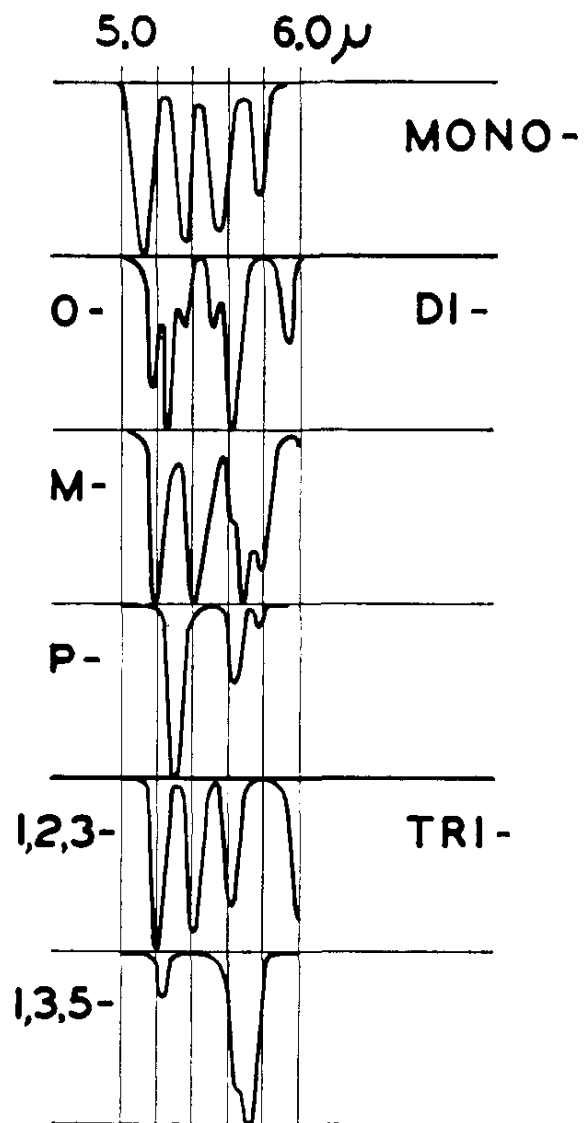
	Substitution	Structure	Range cm ⁻¹	Intensity
1	mono		910-890 770-730 710-680	m* s s
2	1,2-di <i>Ortho</i> -		780-735	s
3	1,3-di <i>meta</i> -		900-835 810-750 725-670	m s m-s
4	1,4-di <i>para</i> - 1,2,3,4-tetra		860-800 860-780	s s
5	1,2,3-tri		800-750 780-760 720-680	s m* m
6	1,3,5-tri (1,2,3,5-tetra 1,2,4,5-tetra penta-)		900-840 865-800 730-675 900-840	m s m* m

* Sometimes lack of band

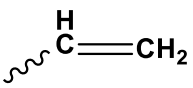
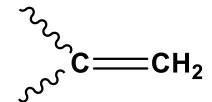
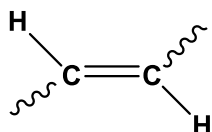
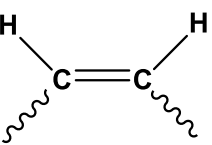
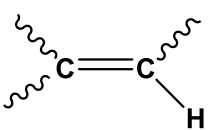
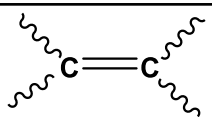
Aromatic Ring Substitution- overtones of γ – out of plane vibration

2000 cm^{-1}

1667 cm^{-1}



Alkenes substitution

	Structure	(γ) bending out of plane [cm^{-1}] ^{1]}	(ν) stretching =C-H [cm^{-1}]	(ν) stretching C=C [cm^{-1}]	overtones
1		1005-985 s 920-900 s	3095-3075 m 3040-3010 m	1660-1635 m	1860-1800 m
2		900-880 s	3095-3075 m	1660-1640 m	1800-1750 m
3		990-960 s	3040-3010 m	1690-1665 w	-----
4		730-665 m	3040-3010 m	1690-1665 w	-----
5		850-790 m	3040-3010 m	1690-1665 w-m (sometimes absent)	-----
6		-----	-----	1690-1650 w (sometimes absent)	-----