

## Infrared

In sample number (1) the peak in region (769.54) near  $778 \text{ Cm}^{-1}$  due to (C=O) a symmetrical stretching, in region (1344.29) near  $1314.39 \text{ Cm}^{-1}$  due to (C-C) symmetrical stretching, and in region (1696.95) near  $1604.64 \text{ Cm}^{-1}$  Due to (OC=O) a symmetrical stretching.

In sample number (2) the peak in region (781.12) near  $778 \text{ Cm}^{-1}$  due to (C=O) a symmetrical stretching, in region (1315.36) near  $1314.39 \text{ Cm}^{-1}$  due to (C-C) symmetrical stretching, and in region (1620.09) near  $1604.64 \text{ Cm}^{-1}$  Due to (OC=O) a symmetrical stretching.

In sample number (3) the peak in region (1625.88) near  $1637.29 \text{ Cm}^{-1}$  due to (C=C) stretching, in region (1022.20) near  $1018.13 \text{ Cm}^{-1}$  due to (N-H) stretching, and in region (736.76) near  $738.03 \text{ Cm}^{-1}$

Due to (C-N) stretching of aromatic.

In sample number (4) the peak in region (1670.24) near  $1637.29 \text{ Cm}^{-1}$  due to (C=C) stretching, in region (1026.06) near  $1018.13 \text{ Cm}^{-1}$  due to (N-H) stretching, and in region (744.47) near  $738.03 \text{ Cm}^{-1}$

Due to (C-N) stretching of aromatic.

In sample number (5) the peak in region (783.05) near  $778 \text{ Cm}^{-1}$  due to (C=O) a symmetrical stretching, in region (1311.50) near  $1314.39 \text{ Cm}^{-1}$  due to (C-C) symmetrical stretching, and in region (1589.23) near  $1604.64 \text{ Cm}^{-1}$  Due to (OC=O) a symmetrical stretching.

In sample number (6) the peak in region (1670.24) near  $1637.29\text{ Cm}^{-1}$  due to (C=C) stretching, in region (1026.06) near  $1018.13\text{ Cm}^{-1}$  due to (N-H) stretching, and in region (744.47) near  $738.03\text{ Cm}^{-1}$

Due to (C-N) stretching of aromatic.

In sample number (7) the peak in region (2360.71) near  $2362.63\text{ Cm}^{-1}$  due to N-H and C-H stretching.

In sample number (8) the peak in region (2378.07) near  $2362.63\text{ Cm}^{-1}$  due to N-H and C-H stretching, in region (1406.01) near  $1469.19\text{ Cm}^{-1}$  due to (N-H<sub>3</sub>) symmetrical bending, and in region (1002.92) near  $970.53\text{ Cm}^{-1}$

Due to (P-O-C) aliphatic stretching)

In sample number (9) the peak in region (2360.71) near  $2362.63\text{ Cm}^{-1}$  due to N-H and C-H stretching.

In sample number (10) the peak in region (1674.10) near  $1637.29\text{ Cm}^{-1}$  due to (C=C) stretching, in region (1026.06) near  $1018.13\text{ Cm}^{-1}$  due to (N-H) stretching, and in region (744.47) near  $738.03\text{ Cm}^{-1}$

Due to (C-N) stretching of aromatic.

In sample number (11) the peak in region (781.12) near  $778\text{ Cm}^{-1}$  due to (C=O) a symmetrical stretching, in region (1315.36) near  $1314.39\text{ Cm}^{-1}$  due to (C-C) symmetrical stretching, and in region (1618.17) near  $1604.64\text{ Cm}^{-1}$

Due to (OC=O) a symmetrical stretching.

In sample number (12) the peak in region (1670.24) near  $1637.29\text{ Cm}^{-1}$  due to (C=C) stretching, in region (1026.06) near  $1018.13\text{ Cm}^{-1}$  due to (N-H) stretching, and in region (744.47) near  $738.03\text{ Cm}^{-1}$

Due to (C-N) stretching of aromatic.

In sample number (13) the peak in region (1623.95) near  $1637.29 \text{ Cm}^{-1}$  due to (C=C) stretching, in region (1022.20) near  $1018.13 \text{ Cm}^{-1}$  due to (N-H) stretching, and in region (740.61) near  $738.03 \text{ Cm}^{-1}$

Due to (C-N) stretching of aromatic.

In sample number (14) the peak in region (1670.24) near  $1637.29 \text{ Cm}^{-1}$  due to (C=C) stretching, in region (1022.20) near  $1018.13 \text{ Cm}^{-1}$  due to (N-H) stretching, and in region (740.61) near  $738.03 \text{ Cm}^{-1}$

Due to (C-N) stretching of aromatic.

In sample number (15) the peak in region (781.12) near  $778 \text{ Cm}^{-1}$  due to (C=O) a symmetrical stretching, in region (1315.38) near  $1314.39 \text{ Cm}^{-1}$  due to (C-C) symmetrical stretching, and in region (1620.9) near  $1604.64 \text{ Cm}^{-1}$

Due to (OC=O) a symmetrical stretching.

In sample number (16) the peak in region (781.12) near  $778 \text{ Cm}^{-1}$  due to (C=O) a symmetrical stretching, in region (1315.36) near  $1314.39 \text{ Cm}^{-1}$  due to (C-C) symmetrical stretching, and in region (1618.17) near  $1604.64 \text{ Cm}^{-1}$

Due to (OC=O) a symmetrical stretching.

In sample number (17) the peak in region (781.12) near  $778 \text{ Cm}^{-1}$  due to (C=O) a symmetrical stretching, in region (1315.36) near  $1314.39 \text{ Cm}^{-1}$  due to (C-C) symmetrical stretching, and in region (1668.31) near  $1604.64 \text{ Cm}^{-1}$

Due to (OC=O) a symmetrical stretching.

In sample number (18) the peak in region (2856.38) near  $2362.63 \text{ Cm}^{-1}$  due to N-H and C-H stretching, in region (1475.44) near  $1469.19 \text{ Cm}^{-1}$  due to (N- $\text{H}_3^+$ ) symmetrical bending, and in region (966.27) near  $970.53 \text{ Cm}^{-1}$

Due to (P-O-C) aliphatic stretching)

In sample number (19) the peak in region (2362.64) near  $2362.63 \text{ Cm}^{-1}$  due to N-H and C-H stretching.

In sample number (20) the peak in region (2308.63) near  $2362.63 \text{ Cm}^{-1}$  due to N-H and C-H stretching.

In sample number (22) the peak in region (761.83) near  $778 \text{ Cm}^{-1}$  due to (C=O) a symmetrical stretching, in region (1369.37) near  $1314.39 \text{ Cm}^{-1}$  due to (C-C) symmetrical stretching, and in region (1645.17) near  $1604.64 \text{ Cm}^{-1}$

Due to (OC=O) a symmetrical stretching.

In sample number (23) the peak in region (748.33) near  $778 \text{ Cm}^{-1}$  due to (C=O) a symmetrical stretching, in region (1367.44) near  $1314.39 \text{ Cm}^{-1}$  due to (C-C) symmetrical stretching, and in region (1645.17) near  $1604.64 \text{ Cm}^{-1}$

Due to (OC=O) a symmetrical stretching