

GCE Chemistry Data Sheet


Table 1
Infrared absorption data

| Bond | Wavenumber /cm ⁻¹ |
|-------------------|------------------------------|
| N—H (amines) | 3300–3500 |
| O—H (alcohols) | 3230–3550 |
| C—H | 2850–3300 |
| O—H (acids) | 2500–3000 |
| C≡N | 2220–2260 |
| C=O | 1680–1750 |
| C=C | 1620–1680 |
| C—O | 1000–1300 |
| C—C | 750–1100 |

Table 2
¹H n.m.r. chemical shift data

| Type of proton | δ/ppm |
|---|-----------|
| ROH | 0.5–5.0 |
| RCH ₃ | 0.7–1.2 |
| RNH ₂ | 1.0–4.5 |
| R ₂ CH ₂ | 1.2–1.4 |
| R ₃ CH | 1.4–1.6 |
| $\begin{array}{c} \\ \text{R}-\text{C}-\text{C}- \\ \quad \\ \text{O} \quad \text{H} \end{array}$ | 2.1–2.6 |
| $\begin{array}{c} \text{R}-\text{O}-\text{C}- \\ \\ \text{H} \end{array}$ | 3.1–3.9 |
| RCH ₂ Cl or Br | 3.1–4.2 |
| $\begin{array}{c} \\ \text{R}-\text{C}-\text{O}-\text{C}- \\ \quad \\ \text{O} \quad \text{H} \end{array}$ | 3.7–4.1 |
| $\begin{array}{c} \text{R} \quad \text{H} \\ \diagdown \quad / \\ \text{C}=\text{C} \\ / \quad \diagdown \end{array}$ | 4.5–6.0 |
| $\begin{array}{c} \text{O} \\ // \\ \text{R}-\text{C} \\ \\ \text{H} \end{array}$ | 9.0–10.0 |
| $\begin{array}{c} \text{O} \\ // \\ \text{R}-\text{C} \\ \\ \text{O}-\text{H} \end{array}$ | 10.0–12.0 |

Table 3
¹³C n.m.r. chemical shift data

| Type of carbon | δ/ppm |
|---|---------|
| $\begin{array}{c} \quad \\ -\text{C}-\text{C}- \\ \quad \end{array}$ | 5–40 |
| $\begin{array}{c} \\ \text{R}-\text{C}-\text{Cl or Br} \\ \end{array}$ | 10–70 |
| $\begin{array}{c} \\ \text{R}-\text{C}-\text{C}- \\ \quad \\ \text{O} \quad \end{array}$ | 20–50 |
| $\begin{array}{c} \\ \text{R}-\text{C}-\text{N} \\ \quad \diagdown \end{array}$ | 25–60 |
| $\begin{array}{c} \\ -\text{C}-\text{O}- \\ \end{array}$ alcohols, ethers or esters | 50–90 |
| $\begin{array}{c} \diagdown \quad / \\ \text{C}=\text{C} \\ \diagup \quad \diagdown \end{array}$ | 90–150 |
| R—C≡N | 110–125 |
|  | 110–160 |
| $\begin{array}{c} \text{O} \\ // \\ \text{R}-\text{C}- \\ \end{array}$ esters or acids | 160–185 |
| $\begin{array}{c} \text{O} \\ // \\ \text{R}-\text{C}- \\ \end{array}$ aldehydes or ketones | 190–220 |

