

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 2¹H 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
$\begin{array}{c} \text{H} \\ \\ \text{R}-\text{C}=\text{C}- \\ \end{array}$	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 3¹³C n.m.r. chemical shift data

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



