

## APPENDIX XII: SELECTED $^1\text{H}$ NMR CORRELATIONS

structural type	chemical shift range (ppm)
cyclopropyl	0.0–0.9
$\text{RNH}_2$ $\text{R}_2\text{NH}$	0.5–5.0 <sup>a</sup>
$-\text{CH}_3$ (saturated)	0.7–1.3
$\text{H}_3\text{C}-\begin{array}{c}   \\ \text{C} \\   \end{array}-\begin{array}{c}   \\ \text{C} \\   \end{array}-\text{X}$ (X = halogen, O, N, carbonyl)	0.9–1.2
$-\begin{array}{c}   \\ \text{CH}_2 \\   \end{array}$ (saturated)	1.2–1.3
$-\begin{array}{c}   \\ \text{CH} \\   \end{array}$ (saturated)	1.4–1.6
$\text{H}_3\text{C}-\begin{array}{c}   \\ \text{C} \\   \end{array}-\text{X}$ (X = halogen, O, N, carbonyl)	1.0–2.0
ROH	1.0–5.0 <sup>a</sup>
$\text{H}_3\text{C}-\begin{array}{c} \diagup \\ \text{C}=\text{C} \\ \diagdown \end{array}$	1.6–1.9
$\text{H}_3\text{C}-\text{C}\equiv\text{C}-$	1.8–2.2
$\text{H}_3\text{C}-\begin{array}{c} \text{O} \\    \\ \text{C} \\ \diagdown \end{array}$	1.9–2.6
$\text{H}_3\text{C}-\text{Ar}$ (Ar = aromatic ring)	2.1–2.6
$\text{H}_3\text{C}-\begin{array}{c} \diagup \\ \text{N} \\ \diagdown \end{array}$	2.1–3.0
$-\text{C}\equiv\text{C}-\text{H}$ (nonconjugated)	2.0–2.6
$-\text{C}\equiv\text{C}-\text{H}$ (conjugated)	2.8–3.1
$\text{H}_3\text{C}-\text{X}$ (X = halogen, O)	2.6–4.4

structural type	chemical shift range (ppm)
Ar-NH <sub>2</sub> Ar <sub>2</sub> NH	3.0–5.0 <sup>a</sup>
ArOH	4.0–10.0 <sup>a</sup>
$\text{H}_2\text{C}=\overset{\diagup}{\text{C}}$ (nonconjugated)	4.6–5.0
$\overset{\text{H}}{\text{C}}=\overset{\diagup}{\text{C}}$ (nonconjugated)	5.1–5.9
$\text{H}_2\text{C}=\overset{\diagup}{\text{C}}$ (conjugated)	5.3–6.3
$\overset{\text{H}}{\text{C}}=\overset{\diagup}{\text{C}}$ (conjugated)	5.3–7.7
ArH	6.0–9.5
$\text{R}-\overset{\text{O}}{\parallel}{\text{C}}-\text{H}$ $\text{Ar}-\overset{\text{O}}{\parallel}{\text{C}}-\text{H}$	9.5–10.5
$\text{R}-\overset{\text{O}}{\parallel}{\text{C}}-\text{OH}$ $\text{Ar}-\overset{\text{O}}{\parallel}{\text{C}}-\text{OH}$	9.7–13.2

<sup>a</sup> Highly dependent upon concentration and solvent effects.