

|       | Br-Br | Br-C | Br-Cl | Br-F | Br-H | Br-O | C#C  | C#N  | C#O  | C-C  | C-Cl | C-F  | C-H  | C-N  | C-O  | C-S  | C=C  | C=N  | C=O  | C=S  | Cl-Cl | Cl-F | Cl-H | Cl-N | Cl-O | Cl-S | F-F  | F-H  | F-O  | F-S  | H-H | H-N  | H-O  | H-S  | N#N  | N-N  | N-O  | N=N  | N=O  | O-O  | O-S  | O=O  | O=S  | S-S  | S=S  |      |      |      |      |      |      |      |      |     |
|-------|-------|------|-------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|-------|------|------|------|------|------|------|------|------|------|-----|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|-----|
| Br-Br | 1.0   | 0.0  | 0.0   | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0   | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0 | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  |      |      |      |      |      |      |      |      |     |
| Br-C  | 0.0   | 1.0  | 0.0   | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.1  | -0.1 | -0.2 | -0.1 | 0.0  | 0.0  | 0.0  | -0.0 | -0.0 | -0.1 | -0.0 | 0.0   | 0.0  | 0.0  | 0.0  | -0.0 | -0.0 | 0.0  | 0.0  | -0.0 | 0.0  | 0.0 | -0.0 | 0.0  | 0.0  | -0.0 | 0.0  | 0.0  | -0.0 | 0.0  | 0.0  | -0.0 | 0.0  | 0.0  | -0.0 | 0.0  | 0.0  | -0.0 |      |      |      |      |      |      |     |
| Br-Cl | 0.0   | 0.0  | 1.0   | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0   | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0 | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  |      |      |      |      |      |      |     |
| Br-F  | 0.0   | 0.0  | 0.0   | 1.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0   | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0 | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  |      |      |      |      |      |     |
| Br-H  | 0.0   | 0.0  | 0.0   | 0.0  | 1.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0   | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0 | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  |      |      |      |      |      |     |
| Br-O  | 0.0   | 0.0  | 0.0   | 0.0  | 0.0  | 1.0  | -0.0 | 0.0  | 0.0  | 0.0  | -0.0 | -0.0 | -0.0 | 0.0  | 0.0  | 0.0  | -0.0 | 0.0  | 0.0  | -0.0 | 0.0   | 0.0  | 0.0  | 0.0  | -0.0 | -0.0 | 0.0  | 0.0  | 0.0  | -0.0 | 0.0 | 0.0  | -0.0 | -0.1 | 0.0  | 0.0  | -0.0 | 0.0  | 0.0  | -0.0 | 0.0  | 0.0  | -0.0 | 0.0  | 0.0  | -0.0 | 0.0  | 0.0  | -0.0 |      |      |      |      |     |
| C#C   | 0.0   | 0.0  | 0.0   | 0.0  | 0.0  | -0.0 | 1.0  | -0.0 | 0.0  | -0.0 | -0.1 | -0.1 | -0.0 | 0.0  | 0.0  | 0.0  | -0.1 | -0.0 | 0.0  | -0.0 | 0.0   | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0 | 0.0  | 0.0  | 0.0  | -0.0 | -0.0 | 0.0  | -0.0 | -0.0 | -0.0 | 0.0  | 0.0  | -0.0 | -0.0 | 0.0  | 0.0  | -0.0 | -0.0 | 0.0  |      |      |      |      |     |
| C#N   | 0.0   | 0.0  | 0.0   | 0.0  | 0.0  | 0.0  | -0.0 | 1.0  | 0.0  | -0.1 | -0.0 | -0.0 | 0.1  | -0.0 | -0.1 | -0.1 | 0.0  | 0.0  | 0.0  | 0.0  | 0.0   | 0.0  | 0.0  | -0.0 | -0.0 | -0.0 | 0.0  | 0.0  | -0.0 | 0.0  | 0.0 | -0.0 | 0.0  | 0.0  | -0.0 | -0.2 | -0.0 | 0.1  | 0.0  | -0.0 | -0.0 | 0.0  | -0.0 | -0.0 | 0.0  | -0.0 | -0.0 | 0.0  | -0.0 | -0.0 |      |      |      |     |
| C#O   | 0.0   | 0.0  | 0.0   | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 1.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0   | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0 | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  |      |      |     |
| C-C   | 0.0   | 0.1  | 0.0   | 0.0  | 0.0  | 0.0  | -0.0 | -0.1 | 0.0  | 1.0  | 0.1  | 0.1  | -0.9 | 0.4  | 0.5  | 0.3  | -0.1 | -0.1 | 0.0  | -0.1 | 0.0   | -0.1 | 0.0  | 0.0  | 0.0  | 0.0  | -0.0 | -0.0 | 0.0  | 0.0  | 0.0 | -0.0 | 0.0  | 0.0  | -0.1 | -0.1 | 0.0  | 0.0  | 0.0  | 0.1  | 0.0  | -0.1 | 0.1  | 0.1  | -0.0 | 0.0  | 0.0  | -0.0 | 0.0  | -0.0 |      |      |      |     |
| C-Cl  | 0.0   | -0.1 | 0.0   | 0.0  | 0.0  | -0.0 | -0.1 | -0.0 | 0.0  | 0.1  | 1.0  | -0.0 | -0.1 | 0.1  | 0.1  | 0.1  | -0.0 | -0.0 | -0.1 | -0.0 | 0.0   | 0.0  | 0.0  | 0.0  | -0.0 | -0.0 | 0.0  | 0.0  | 0.0  | 0.0  | 0.0 | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | -0.0 | 0.0  | 0.0  | -0.0 |      |     |
| C-F   | 0.0   | -0.2 | 0.0   | 0.0  | 0.0  | -0.0 | -0.1 | -0.0 | 0.0  | 0.1  | -0.0 | 1.0  | -0.1 | 0.0  | 0.0  | 0.0  | -0.0 | -0.0 | -0.0 | -0.0 | 0.0   | 0.0  | 0.0  | 0.0  | -0.0 | -0.0 | 0.0  | 0.0  | 0.0  | 0.0  | 0.0 | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | -0.0 | 0.0  | 0.0  | -0.0 |      |     |
| C-H   | 0.0   | -0.1 | 0.0   | 0.0  | 0.0  | -0.0 | -0.0 | 0.1  | 0.0  | -0.9 | -0.1 | -0.1 | 1.0  | -0.5 | -0.6 | -0.4 | -0.1 | 0.1  | -0.1 | 0.2  | 0.0   | 0.0  | 0.0  | -0.0 | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0 | 0.0  | 0.0  | 0.0  | 0.1  | 0.1  | -0.1 | -0.0 | -0.0 | -0.1 | -0.0 | 0.1  | -0.1 | -0.1 | 0.0  | -0.0 | -0.0 | 0.0  | 0.0  | -0.0 | 0.0  |      |      |     |
| C-N   | 0.0   | 0.0  | 0.0   | 0.0  | 0.0  | 0.0  | -0.0 | 0.0  | 0.4  | 0.1  | 0.0  | -0.5 | 1.0  | 0.3  | 0.3  | -0.0 | -0.5 | 0.1  | -0.2 | 0.0  | 0.0   | 0.0  | 0.0  | -0.0 | -0.0 | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0 | 0.0  | 0.0  | -0.3 | -0.0 | 0.0  | 0.0  | -0.0 | 0.1  | 0.0  | -0.1 | 0.0  | 0.1  | -0.0 | 0.0  | 0.0  | -0.0 | 0.0  | 0.0  | -0.0 |      |      |      |     |
| C-O   | 0.0   | 0.0  | 0.0   | 0.0  | 0.0  | 0.0  | -0.1 | 0.0  | 0.5  | 0.1  | 0.0  | -0.6 | 0.3  | 1.0  | 0.3  | 0.0  | -0.1 | -0.0 | -0.1 | 0.0  | 0.0   | 0.0  | 0.0  | 0.0  | 0.0  | -0.0 | 0.0  | 0.0  | 0.0  | 0.0  | 0.0 | 0.0  | 0.0  | -0.0 | -0.1 | 0.1  | 0.0  | 0.0  | 0.1  | 0.0  | -0.0 | -0.0 | -0.0 | 0.0  | 0.0  | 0.0  | -0.0 | 0.0  | 0.0  | -0.0 |      |      |      |     |
| C-S   | 0.0   | 0.0  | 0.0   | 0.0  | 0.0  | 0.0  | -0.1 | 0.0  | 0.3  | 0.1  | 0.0  | -0.4 | 0.3  | 0.3  | 1.0  | -0.1 | -0.1 | 0.0  | -0.3 | 0.0  | 0.0   | 0.0  | 0.0  | -0.0 | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0 | 0.0  | 0.0  | -0.0 | -0.1 | -0.0 | 0.0  | 0.1  | -0.0 | -0.0 | 0.0  | 0.1  | -0.0 | -0.0 | -0.0 | 0.0  | 0.1  | -0.0 | -0.0 | -0.0 | 0.0  |      |      |     |
| C=C   | 0.0   | -0.0 | 0.0   | 0.0  | 0.0  | -0.0 | -0.1 | 0.0  | 0.0  | -0.1 | -0.0 | -0.0 | -0.1 | -0.0 | 0.0  | -0.1 | 1.0  | -0.1 | 0.0  | -0.0 | 0.0   | 0.0  | 0.0  | 0.0  | -0.0 | -0.0 | 0.0  | 0.0  | 0.0  | 0.0  | 0.0 | 0.0  | 0.0  | 0.0  | 0.1  | -0.0 | 0.0  | -0.0 | -0.0 | -0.0 | 0.0  | 0.0  | -0.0 | 0.0  | 0.0  | -0.0 | 0.0  | 0.0  | -0.0 | 0.0  | 0.0  | -0.0 |      |     |
| C=N   | 0.0   | -0.0 | 0.0   | 0.0  | 0.0  | 0.0  | -0.0 | 0.0  | 0.0  | -0.1 | -0.0 | -0.0 | 0.1  | -0.5 | -0.1 | -0.1 | -0.1 | 1.0  | -0.0 | 0.1  | 0.0   | 0.0  | 0.0  | -0.1 | 0.0  | -0.0 | 0.0  | 0.0  | 0.0  | 0.0  | 0.0 | 0.0  | 0.0  | 0.0  | 0.2  | -0.0 | -0.0 | -0.0 | -0.3 | -0.1 | -0.0 | 0.2  | 0.0  | -0.0 | -0.0 | 0.0  | 0.0  | -0.0 | 0.0  | 0.0  | -0.0 |      |      |     |
| C=O   | 0.0   | -0.1 | 0.0   | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | -0.1 | -0.0 | -0.1 | 0.1  | -0.0 | 0.0  | 0.0  | -0.0 | 1.0  | -0.1 | 0.0  | 0.0   | 0.0  | 0.0  | 0.0  | 0.0  | -0.0 | 0.0  | 0.0  | 0.0  | 0.0  | 0.0 | 0.0  | 0.0  | 0.0  | -0.0 | -0.1 | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | -0.0 | -0.0 | 0.0  | 0.0  | 0.0  | -0.0 | 0.0  | 0.0  | -0.0 |     |
| C=S   | 0.0   | -0.0 | 0.0   | 0.0  | 0.0  | -0.0 | -0.0 | 0.0  | 0.0  | -0.1 | -0.0 | -0.0 | 0.2  | -0.2 | -0.1 | -0.3 | -0.0 | 0.1  | -0.1 | 1.0  | 0.0   | 0.0  | 0.0  | -0.0 | 0.0  | -0.0 | 0.0  | 0.0  | 0.0  | 0.0  | 0.0 | 0.0  | 0.0  | 0.0  | -0.2 | 0.0  | 0.0  | 0.0  | -0.0 | -0.0 | 0.0  | 0.0  | 0.0  | -0.0 | -0.0 | 0.0  | 0.0  | 0.0  | -0.0 | 0.0  | 0.0  | -0.0 |      |     |
| Cl-Cl | 0.0   | 0.0  | 0.0   | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 1.0   | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0 | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  |     |
| Cl-F  | 0.0   | 0.0  | 0.0   | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0   | 1.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0 | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  |     |
| Cl-H  | 0.0   | 0.0  | 0.0   | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0   | 1.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0 | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  |     |
| Cl-N  | 0.0   | 0.0  | 0.0   | 0.0  | 0.0  | 0.0  | -0.0 | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | -0.0 | 0.0  | 0.0  | -0.1 | 0.0  | -0.0 | 0.0   | 0.0  | 1.0  | -0.0 | -0.0 | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0 | 0.0  | 0.0  | 0.0  | -0.0 | -0.0 | 0.0  | 0.0  | 0.1  | 0.1  | 0.0  | -0.3 | 0.0  | 0.0  | -0.0 | 0.0  | 0.0  | -0.0 | 0.0  | 0.0  | -0.0 |      |      |     |
| Cl-O  | 0.0   | -0.0 | 0.0   | 0.0  | 0.0  | -0.0 | -0.0 | -0.0 | -0.0 | -0.0 | 0.0  | 0.0  | 0.0  | 0.0  | -0.0 | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0   | 0.0  | -0.0 | 1.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0 | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | -0.0 | -0.0 | -0.0 | -0.0 | -0.0 | 0.0  | -0.2 | -0.0 | 0.1  | -0.0 | -0.0 | 0.0  | 0.0  | -0.0 | 0.0  |      |      |     |
| Cl-S  | 0.0   | -0.0 | 0.0   | 0.0  | 0.0  | -0.0 | -0.0 | -0.0 | -0.0 | -0.0 | 0.0  | 0.0  | 0.0  | 0.0  | -0.0 | 0.0  | 0.0  | -0.0 | -0.0 | -0.0 | 0.0   | 0.0  | 0.0  | -0.0 | 1.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0 | 0.0  | 0.0  | 0.0  | 0.0  | -0.0 | -0.0 | 0.0  | 0.0  | -0.0 | -0.0 | 0.0  | 0.0  | -0.0 | 0.0  | 0.3  | 0.0  | -0.5 | -0.0 | 0.2  | 0.0  | 0.0  | -0.0 |     |
| F-F   | 0.0   | 0.0  | 0.0   | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0   | 0.0  | 0.0  | 0.0  | 0.0  | 1.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0 | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  |     |
| F-H   | 0.0   | 0.0  | 0.0   | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0   | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 1.0  | 0.0  | 0.0  | 0.0  | 0.0 | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0 |
| F-O   | 0.0   | -0.0 | 0.0   | 0.0  | 0.0  | -0.0 | 0.0  | -0.0 | 0.0  | -0.0 | -0.0 | -0.0 | 0.0  | -0.0 | 0.0  | -0.0 | 0.0  | 0.0  | 0.0  | 0.0  | 0.0   | 0.0  | 0.0  | -0.0 | 0.0  | 0.0  | 0.0  | 1.0  | 0.0  | 0.0  | 0.0 | 0.0  | 0.0  | 0.0  | 0.0  | -0.0 | -0.0 | -0.0 | -0.0 | -0.0 | 0.0  | -0.2 | -0.0 | 0.1  | -0.0 | -0.0 |      |      |      |      |      |      |      |     |