Supplementary Information

A family of immobilizable chiral bis-(pinene-bipyridine) ligands

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The ^{1}H-NMR spectra of **4**, **6**, **L3**, **L4** and **L5** are given in the main article.

^{13}C NMR spectra:

4. **^{13}C NMR** (75.47 MHz, $CDCl_3$) δ 24.65 (9), 65.00 (C10,11), 65.80 (C10), 108.40 (C6), 108.71 (C8), 118.69 (C4), 120.67, 136.66 (C2,3), 159.36 (C1), 159.92 (C5)

6. **^{13}C NMR** (75.47 MHz, $CDCl_3$) δ 25.60 (C9) 66.12 (C6), 108.16 (C6), 121.00, 124.61, 137.37 (C2,3,4), 152.97 (C5), 159.03 (C1), 200.22 (C8)

L3. **^{13}C NMR** (75.47 MHz, $CDCl_3$) δ 21.37 (C16), 26.15 (C17), 32.04 (C15), 36.75 (C13), 39.61 (C11), 40.32 (C12), 46.53 (C10), 65.97 (-O(*C*H_2)$_2$O-), 108.76 (C18), 118.53 (C7), 119.9 (C4), 120.47 (C2), 133.78 (C8), 137.13 (C3), 142.17 (C9), 153.63 (C6), 156.1 (C5,14), 159.23 (C1)

L4. **^{13}C NMR** (75.47 MHz, $CDCl_3$) δ 21.42 (C16), 26.17 (C17), 32.04 (C15), 36.81 (C13), 39.65 (C11), 40.34 (C12), 46.61 (C10), 118.50 (C7), 123.26 (C4), 124.66 (C2), 133.96 (C8), 137.29 (C3), 142.79 (C9), 153.01 (C6), 153.84 (C1), 156.26 (C5), 156.52 (C14), 193.34 (C18)

L5. **^{13}C NMR** (75.47 MHz, $CDCl_3$) δ 21.46 (C16), 26.19 (C17), 32.07 (C15), 36.82 (C13), 39.68 (C11), 40.35 (C12), 46.63 (C10), 75.36 (C18), 118.04 (C7), 119.68 (C4), 120.69 (C2), 133.89 (C8), 137.81 (C3), 142.56 (C9), 153.32 (C6), 155.18 (C5), 156.63 (C11), 160.21 (C1)

X-ray crystallography

The intensity data for compounds **2**, **3**, **L3** and **L4** were collected at 173 K and for **4** at 200 K, on a Stoe Mark 2 Image Plate Diffraction System[1] equiped with a two-circle goniometer and using MoKα graphite monochromated radiation (λ = 0.71073 Å). For compound **7** intensity data were collected at 200 K on a Stoe Mark 2T IPDS[1] using CuKα graphite monochromated radiation (λ = 1.54186 Å). The structures were solved by direct methods using the programme SHELXS-97.[2] The refinement and all further calculations were carried out using SHELXL-97.[2] The C-bound H-atoms were included in calculated positions and treated as riding atoms using SHELXL default parameters. The non-H atoms were refined anisotropically, using weighted full-matrix least-squares on F^2. Semi-empirical absorption corrections were applied using the MULscanABS routine in PLATON[3] for compounds **2**, **3**, **L3** and **L4**, and numerical/integration corrections for **4** and **7** using XSHAPE.[1]

In compounds **3**, **4** and **L3** the 1,3-dioxolane CH_2 groups are disordered over two positions: refined with a fixed ratio of 0.7:0.3 for **3**, 0.6:0.4 for **4**, and a refined ratio of 0.512(9):0.488(9) for **L3**.

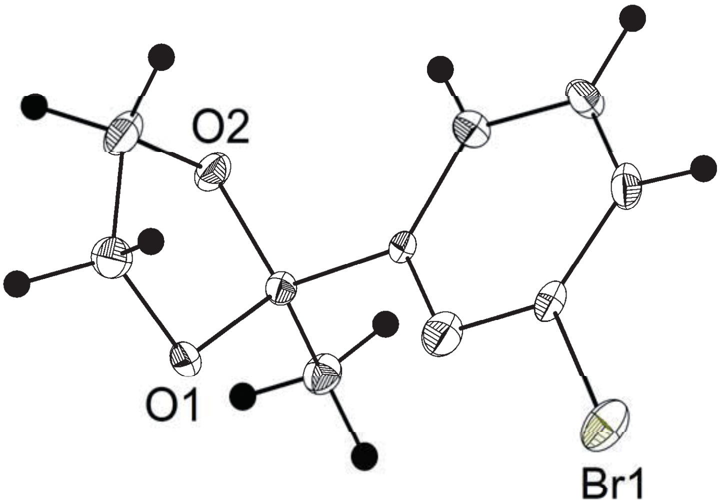

Figure S1. ORTEP representation at 30% probability and atom numbering scheme for **2**.

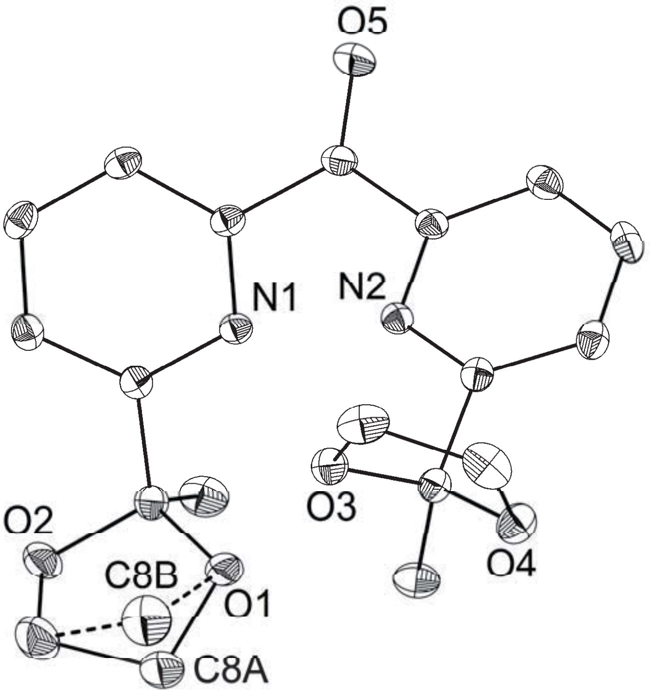

Figure S2. ORTEP representation at 30% probability and atom numbering scheme for **3**. Hydrogen atoms omitted for clarity.

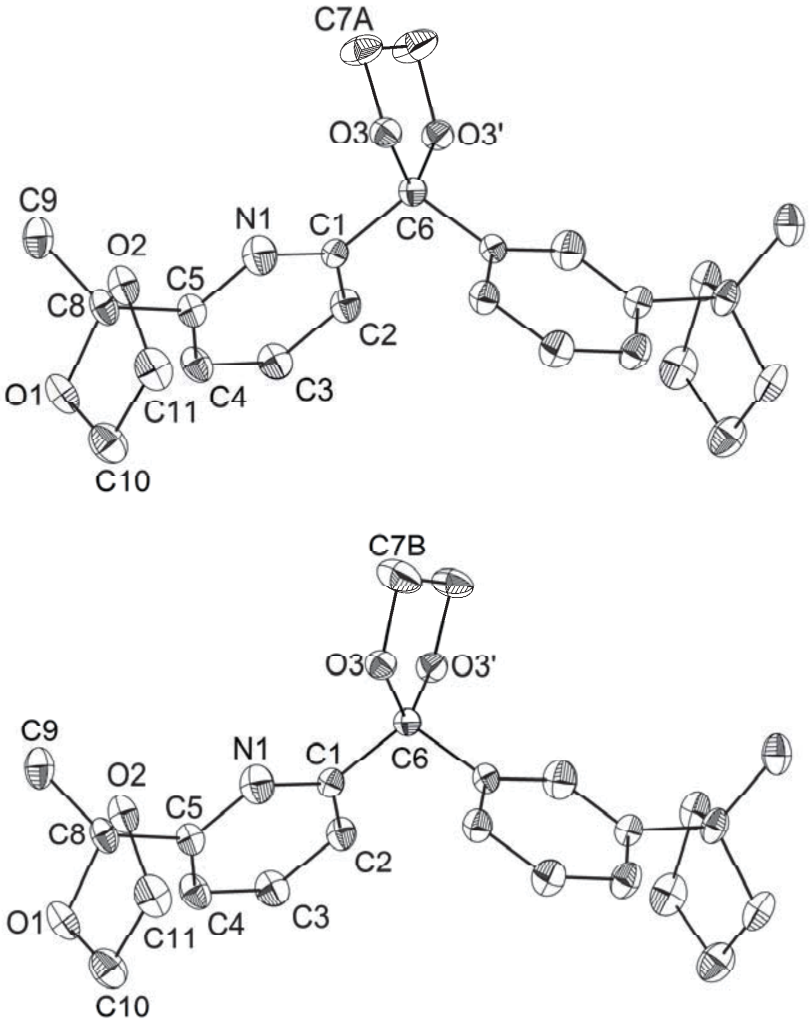

Figure S3. ORTEP representation at 30% probability and atom numbering scheme for **4**. Both molecules with the two possible dioxolane ring positions are represented. Hydrogen atoms omitted for clarity.

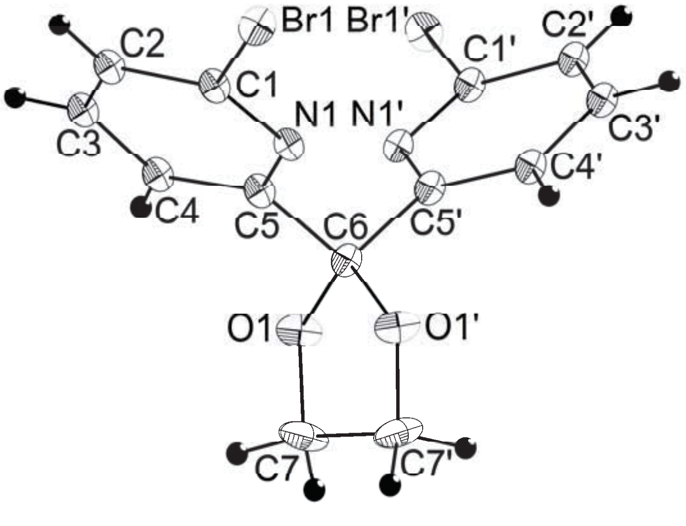

Figure S4. ORTEP representation at 30% probability and atom numbering scheme for **7**.

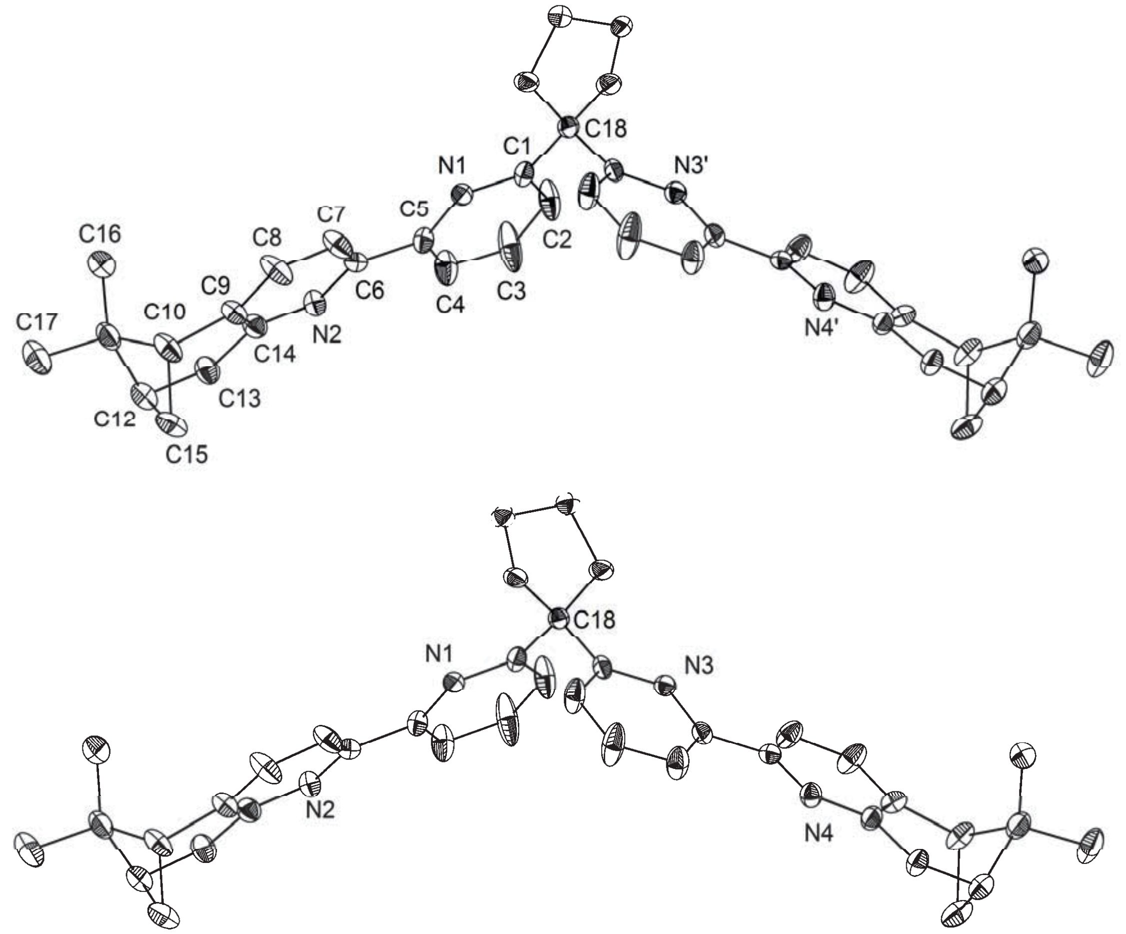

Figure S5. ORTEP representation at 30% probability and atom numbering scheme for **L3**. Both molecules with the two possible dioxolane ring positions are represented. Hydrogen atoms omitted for clarity.

References

1. Stoe & Cie. (2009). *X-Area, X-RED32 and XSHAPE*. Stoe & Cie GmbH, Darmstadt, Germany.
2. Sheldrick, G. M. (2008) Acta Cryst. A64, 112-122.
3. Spek, A .L. (2009). Acta Cryst. D65, 148-155.