Supporting Information

Water-Soluble Aryl-Extended Calix[4]pyrroles with Unperturbed Aromatic Cavities: Synthesis and Binding Studies

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$^1$H and $^{13}$C($^1$H)-NMR spectra of compounds. All the NMR spectra were measured at 25°C

$^1$H NMR (500 MHz, CDCl$_3$) spectrum of compound 8

$^1$H NMR (300 MHz, CDCl$_3$) spectrum of compound 4
$^1$H NMR (300 MHz, CDCl$_3$) and $^{13}$C NMR ($^1$H) DEPTQ 135 (125 MHz, CDCl$_3$) spectra of compound 3
$^1$H NMR (500 MHz, CDCl$_3$) spectrum of compound 10

$^1$H NMR (400 MHz, D$_2$O), $^{13}$C NMR {$^1$H} (125 MHz with cryoprobe, D$_2$O), $^{13}$C NMR {$^1$H} DEPTQ 135 (125 MHz with cryoprobe, D$_2$O) and $^{13}$C NMR {$^1$H} HSQC (125 MHz with cryoprobe, D$_2$O) spectra of compound 2. (PD = 7.2 adjusted with NaOD solution in D$_2$O)
HRMS spectra

HRMS (ESI-TOF) m/z: [M + Na]^+ spectrum of compound 3. Top measured, bottom calculated.
HRMS (MALDI-TOF) spectrum of compound 2 [M + Na]$^+$ (top measured, bottom calculated)
$^1$HNMR titration of receptor 2 with PNO13 and ROESY \textsuperscript{$^1$}HNMR of the complex in presence of an excess of PNO13.

\begin{figure}
\centering
\includegraphics[width=\textwidth]{FigureS1}
\caption{Selected downfield regions of the $^1$H-NMR spectra (400 MHz, D$_2$O adjusted to pD=7.2 with NaOD, 273 K) obtained during the titration of calix[4]pyrrole 2 (1 mM) with incremental amounts of PNO 13. See figure 3 in the manuscript for proton numbering. Prime letters and numbers represent proton signals corresponding to encapsulation complex PNO13<2.}
\end{figure}
**Figure S2**: Selected region of ROESY $^1$H NMR experiment of complex 13$\subset$2 in presence of 2.6 eq of PNO 13. Prime letters represent proton signals corresponding to PNO 13 in complex 13$\subset$2. See figure 3 in the manuscript for proton lettering.

**ITC Experiments**

Titrations were carried out on a Microcal VP-ITC microcalorimeter, at 298 K, in water adjusting the pH by addition of NaOH(aq) solution until pH≈ 11 and then adjusting with HCl(aq) solution until pH≈7.2. The association constants between receptor 2 and pyridine N-oxide 11, 12 and 13 were determined by monitoring the heat released by the system as incremental amounts of the N-oxide 11, 12 or 13 were added. The values of the association constant $K_a$ and the enthalpy of binding $\Delta H$ were calculated using the Origin 7 software package which uses least-squares minimization to obtain globally optimized parameters as described in Wiseman et al.$^1$ In all cases the data fit well to a simple 1:1 binding model.

Specifically, the association constants were determined using solution of 2 in water at 296 K, and adding aliquots of a solution of pyridine N-oxide derivatives, approximately 10 times more concentrated, also in the same media. The association constant ($K_a$), TΔS and ΔH values for the binding process were determined by averaging the values from the titrations.
Figure S3: Top: Raw data for the ITC titration in water of PNO derivatives into receptor 2. Bottom: Binding isotherm of calorimetric titration data shown on top. a) PNO11 over [2] = 0.62mM in H2O; pH = 7.22. b) PNO 12 over [2] = 0.17mM in H2O; pH = 7.21. c) PNO 13 over [2] = 0.63mM in H2O; pH = 7.23. c) = 7.43.