Supporting Information

Proton-Switchable Vapochromic Behaviour of a Platinum(II)-Carboxy-Terpyridine Complex

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**Figure S1.** The positions of disordered water molecules between the adjacent two complex molecules in $\text{1}\cdot 3.5\text{H}_2\text{O}$.

**Figure S2.** IR spectra of $\text{[1H]}\text{Cl}\cdot 3\text{H}_2\text{O}$ before and after exposure to MeCN vapour for 3 days at room temperature.
Figure S3. Thermogravimetric analysis for $[1\text{H}]\text{Cl}\cdot 3\text{H}_2\text{O}$ in $\text{N}_2$ atmosphere. Observed weight loss (8.8 % at 250 min heating) is quantitatively agreed with the amount of the three hydrated water molecules (9.0 %) in the $[1\text{H}]\text{Cl}\cdot 3\text{H}_2\text{O}$. 
Figure S4. ¹H NMR spectra (DMSO-d₆) of as-synthesized [1H]Cl·3H₂O (blue) and after exposure to MeCN vapour for 3 days at room temperature (black). The inset shows the magnification of the aromatic region from 7.5 to 9.5 ppm. The signal of OH proton of carboxylic acid group was not observed probably due to the rapid exchange with protons of water molecules.
Figure S5. Change of luminescence spectrum of [1H]Cl·3H₂O before (black) and after (red) exposure to MeCN vapour for 3 days at room temperature.

Figure S6. UV-Vis absorption spectra in DMSO of as-synthesized [1H]Cl·3H₂O (blue) and after exposure to MeCN vapour for 3 days at room temperature (black).
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Figure S12. $^1$H NMR spectrum of [1H]Cl·3H₂O after exposing it to triethylamine vapour (4%ND₃ in D₂O). The inset shows the magnification of the aromatic region from 7.5 to 9.0 ppm. The ratio of integral intensities of the signals B to b is 9 : 2, indicating the formation of the equimolar amount of the complex 1 and [TEA-H]$^+$Cl$^-$. 
Figure S13. Changes of (a) PXRD pattern and (b) IR spectrum of $1 \cdot H_2O$ under exposure to humid HNO$_3$ or CH$_3$COOH vapour at room temperature. The bottom blues lines show the pattern and spectrum of the dark-blue protonated form $[1H]Cl \cdot 3H_2O$. The blue and black dotted lines in (b) indicate the positions of the $\nu$(C=O) modes of carboxy groups of protonated $[1H]Cl \cdot 3H_2O$ and deprotonated $1 \cdot H_2O$, respectively.