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Supporting Information

(6 pages including this one)

Artificial Miniaturized Luminescent Materials based on Perylene-covered Glass Surfaces

Samir Mameri,**[a] **Joanna R. Siekierzycka and Albert M. Brouwer

Contribution from the Van't Hoff Institute for Molecular Sciences (HIMS), University of Amsterdam, Nieuwe Achtergracht 129, 1018 WS Amsterdam, The Netherlands

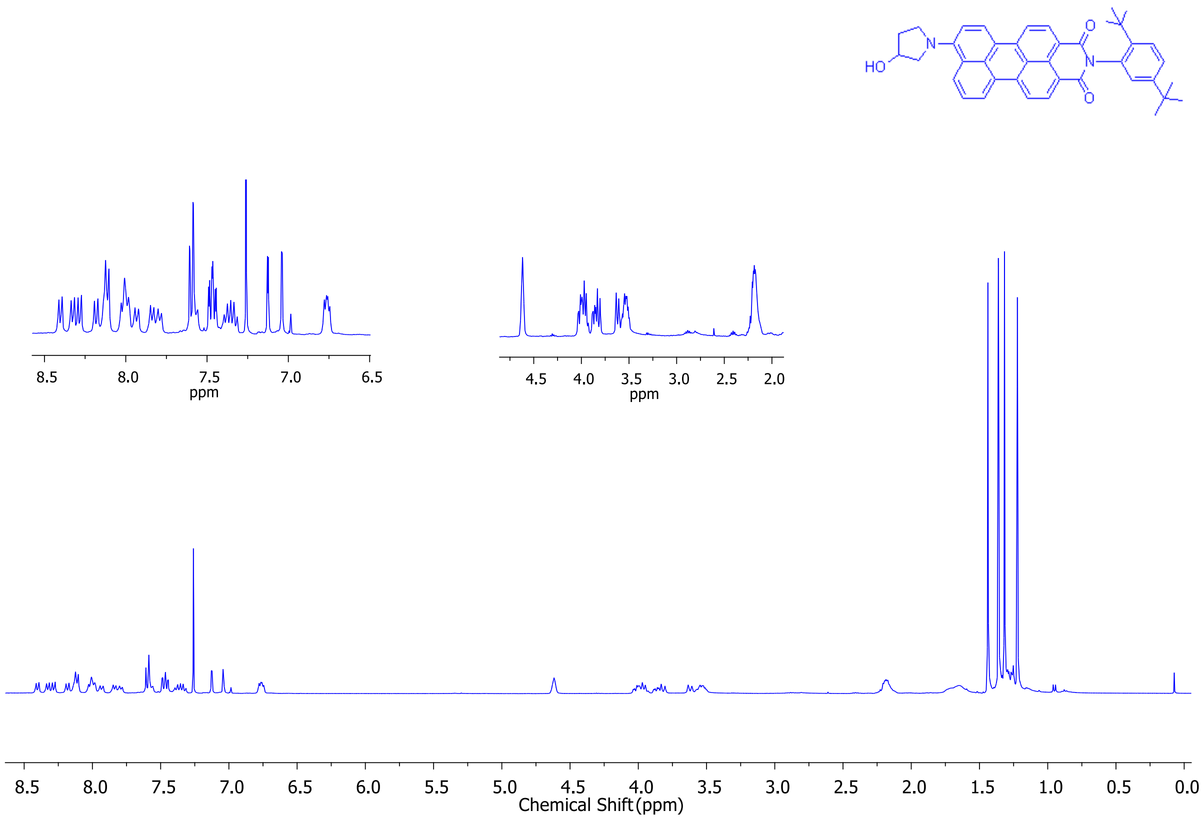
[a] Present address: Dr. S. Mameri
Laboratoire de Chimie Moléculaire, UMR CNRS 7509, Université de Strasbourg, 25 rue Becquerel, Strasbourg 67087, FRANCE. E-mail: mameri@unistra.fr. Homepage URL: http://ecpm.unistra.fr/recherche/laboratoire-de-chimie-moleculaire-umr-7509/

Experimental details

Materials and methods

The 400.1 (^{1}H) and 100.3 MHz (^{13}C) spectra were recorded at room temperature (rt) on a *Bruker AC 400 avance series* spectrometer, using perdeuterated chloroform as internal standard: δ (H) in ppm relative to residual protiated solvent; δ (C) in ppm relative to the solvent.

^{1}H- and ^{13}C-NMR spectra of compounds 4 and 1



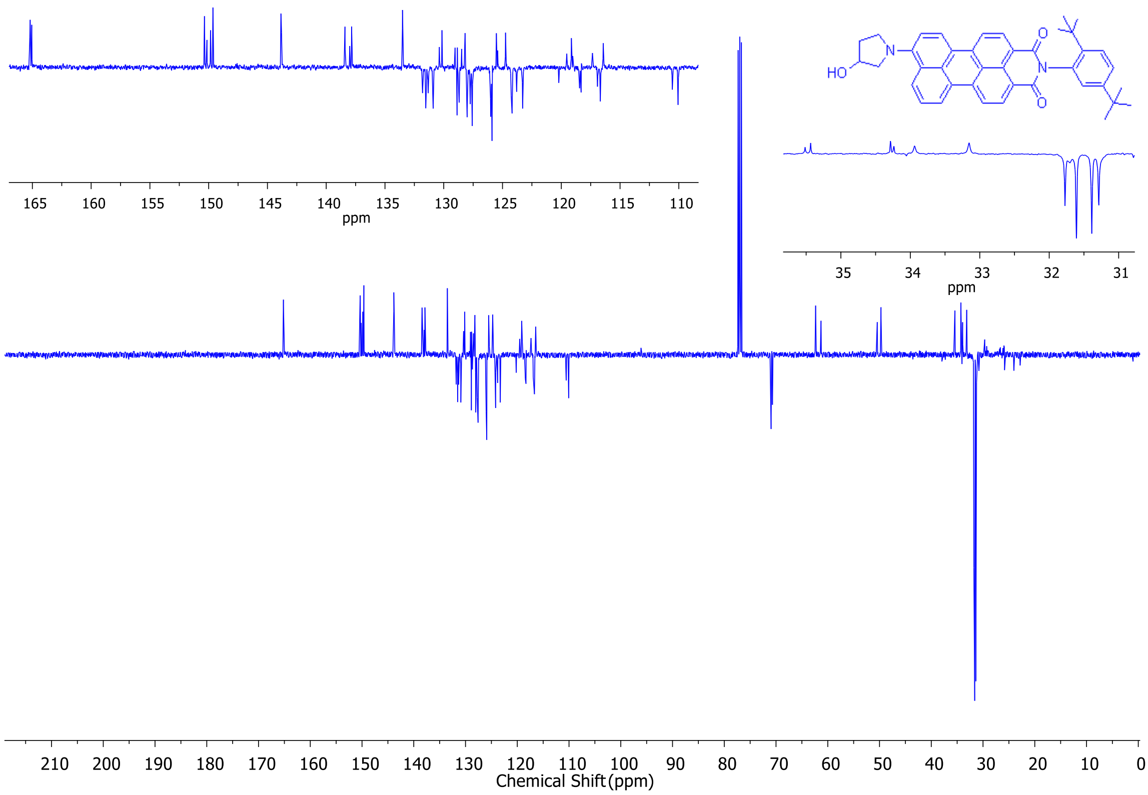
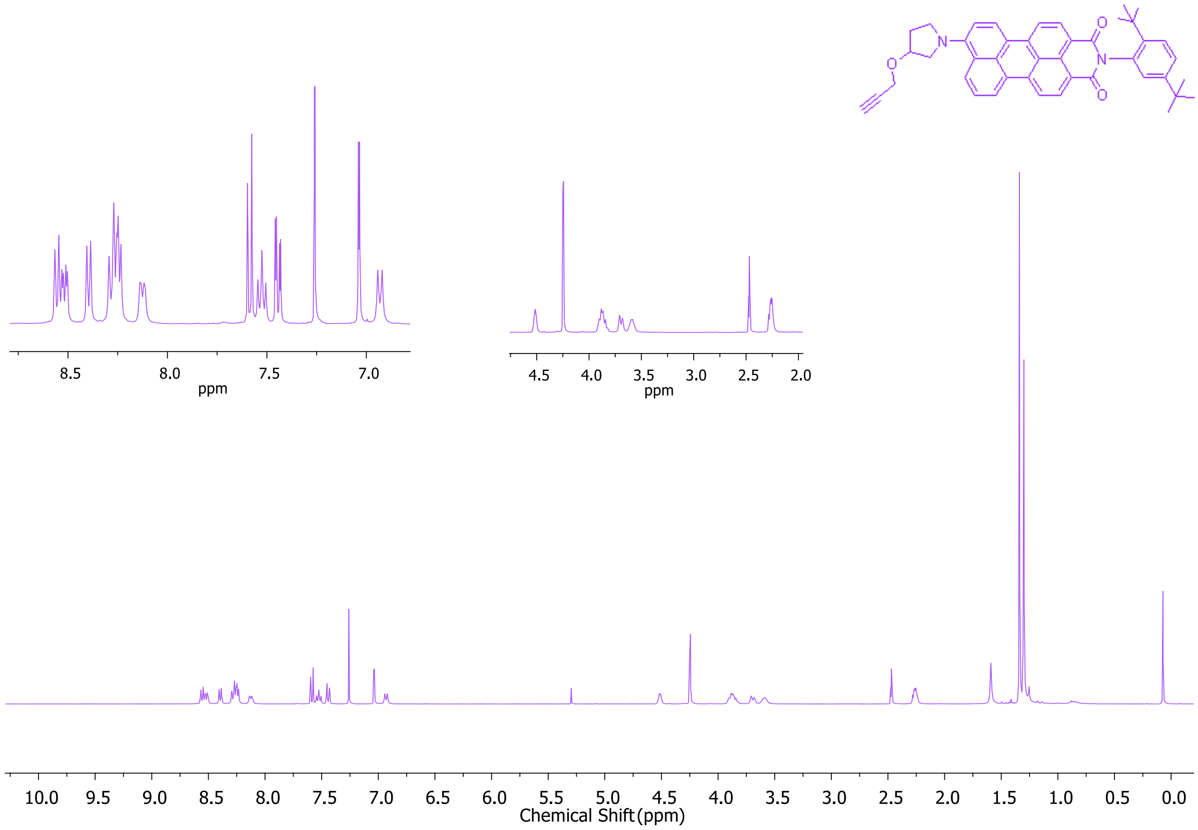


Fig. S1 [1]H (top) and [13]C (bottom) NMR spectra of compound **4** ($CDCl_3$, 20 °C).



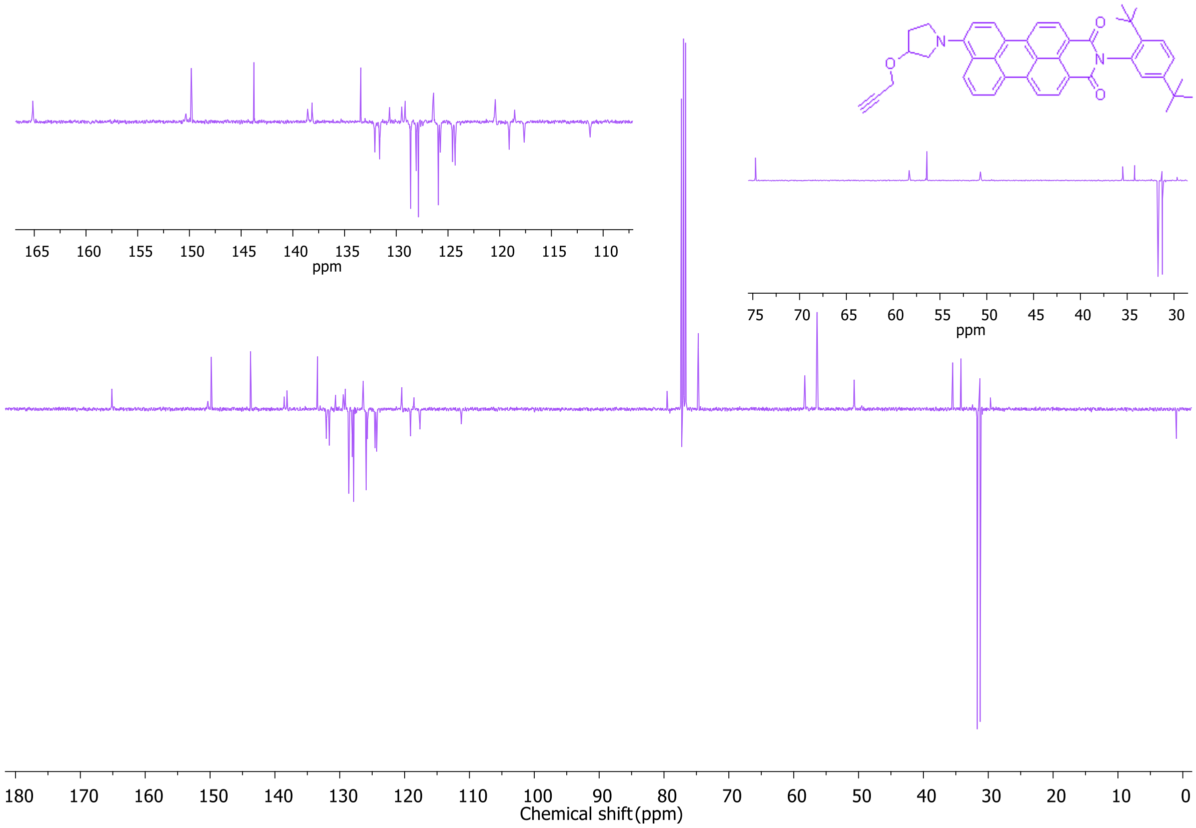


Fig. S2 ^{1}H (top) and ^{13}C (bottom) NMR spectra of alkyne-perylene **1** ($CDCl_3$, 20 °C).

Steady-state absorption and emission spectroscopy in solution

UV-Visible absorption spectra were recorded on a Carry300 spectrophotometer. Emission and excitation spectra were recorded on a Fluorolog-3 spectrophotometer. The spectra were corrected for the instrumental response. A *Hamamatsu* photomultiplier was used, and the luminescence was detected in a right angle configuration.

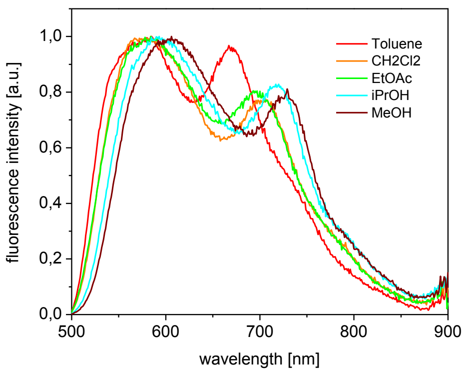


Fig. S3 Emission spectra of **1** in common organic solvents (λ_{exc} = 488 nm, T = 298 K).

Functionalization and characterization of glass surfaces

All SAMs were prepared using the glass vessels we have developed [Fig. S4].[1] By this, the mixtures can be kept safely from air and re-used to ones convenience; making such systems useful tools offering practical, economical and environmental benefits.

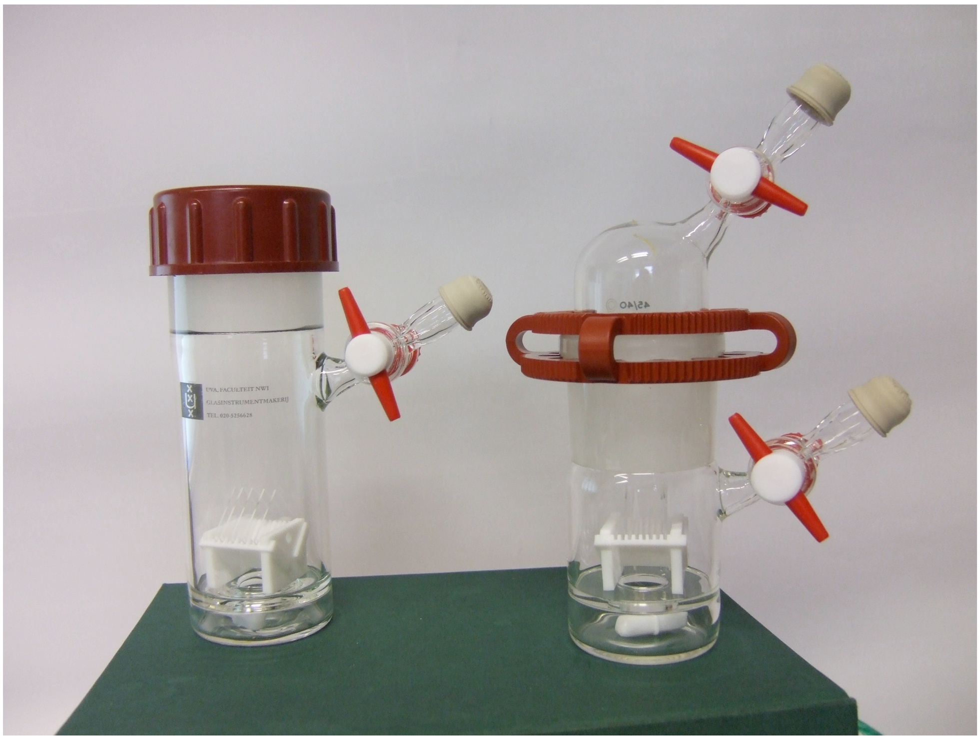


Fig. S4 Glass vessels for surface functionalization.

Emission spectroscopy in the solid state (SAM)

Confocal scanning images were recorded using an inverted light microscope (IX71, Olympus) equipped with an oil immersion, 100x, 1.4 oil objective (UPlanSApo, Olympus). Excitation wavelength was chosen to be 488 nm. The wavelength of excitation beam from pulsed Ti:Sapphire laser Chameleon ULTRA-II (976 nm, 80 fs, 80 MHz repetition rate) was doubled using Second Harmonic Generator (APE). Excitation light was coupled into the microscope *via* polarization maintaining monomode fiberglass (PMC-400-4-NA010-3-XPC). Filter-set applied for an experiment is depicted in Fig. S5. Pinhole diameter was of 100 μm. Output power from the objective was approximately 20 μW (0.3 fJ/pulse). Scans and lifetime measurements were done using single photon avalanche diode (SPAD SPCM-AQR-13, Perkin Elmer) connected to the PCI-board for Time-Correlated Single Photon Counting (TimeHarp200, PicoQuant). Data acquisition and analysis were performed using SymPho Time software. Acquisition resolution for a fluorescence time trace was 39 ps (binning time: 20 ms), and the number of pixels per scan area was 150 × 150. Lifetime calculations from fluorescence time traces were done using Maximum Likelihood Estimation method. Emission spectra of surfaces were recorded using CCD camera PhotonMax (Roper Scientific) connected to the Main Optical Unit of the confocal system (PiqoQuant). The fluorescence spectra were corrected for the instrumental response.

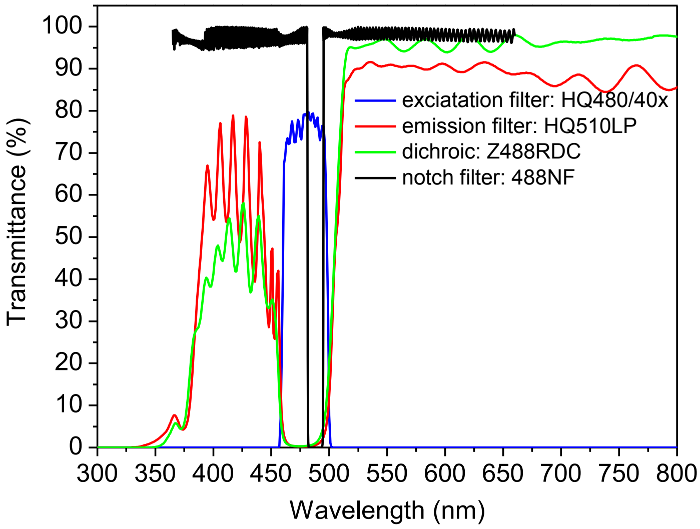


Fig. S5 Filter-set for confocal measurements.

Notes and References

1 Design: Dr. Samir Mameri (mameri@unistra.fr).