Abstract

Mew-substituted bisferrocenyl porphyrins and mew-substituted symmetrical porphyrins were synthesized. The porphyrin precursors, dipyrrromethanes, were synthesized by using the modified procedure with good yield. Short separated bisferrocenyl porphyrins containing anthracene and p-nitrophenyl groups at meso positions were synthesized and characterized using UV-vis, NMR and MALDI-TOF spectroscopic techniques. The synthesized bisferrocenyl porphyrins were examined for light-harvesting properties using nanosecond transient absorption spectroscopy and time correlated single photon counting technique. Azo-benzene based conjugated molecular wire containing bisferrocenyl porphyrin was fabricated on glassy carbon electrode. The molecular wire was characterized by cyclic voltammetry, ATR-FT-IR and diffused reflectance absorption spectroscopy. Symmetrically me.so-substituted porphyrins mew-tetrakis(4-sulfonatophenyl)-porphyrin, mew-tetramesitylporphyrin were used to fabricate nanostructures of porphyrin aggregates on glass surface using hydrogen chloride (HC1) vapour. Aggregates were characterized by spectral, AFM and TEM techniques. Mew-tetramesitylporphyrin, mew-tetraphenylporphyrin and mew-tetralsd(4-nitrophenyl)porphyrin coated glass plates were examined for hydrogen chloride gas sensing. Among the porphyrin derivatives, meso-tetramesitylporphyrin coated glass plate showed remarkable sensitivity towards HC1 gas with the detection limit of 0.03 ppm.