Title:	Efficient electron transporting and panchromatic absorbing FRET cassettes based on aza-BODIPY and perylenediimide towards multiple metal FRET-Off sensing and ratiometric temperature sensing
Authors:	Rani, Kavita (/jspui/browse?type=author&value=Rani%2C+Kavita) Pandey, Upendra K. (/jspui/browse?type=author&value=Pandey%2C+Upendra+K.) Sengupta, Sanchita (/jspui/browse?type=author&value=Sengupta%2C+Sanchita)
Keywords:	FRET perylenediimide
Issue Date:	2021
Publisher:	Publishing
Citation:	Journal of Materials Chemistry C, 9(13), 4607–4618.
Abstract:	Multichromophoric triads 1 and 2 based on aza-BODIPY as the central chromophore and bay-substituted (tetrachloro- and tetraphenoxy-)perylenediimides (PDI) as peripheral chromophores have been designed and synthesized that are panchromatic absorbers and near infrared (NIR) emitters. Both triads 1 and 2 exhibited ~99% Förster resonance energy transfer (FRET) from the peripheral PDIs to central aza-BODIPY. The excitation energy transfer from PDI to aza-BODIPY was studied via steady state emission, fluorescence quantum yield, time resolved fluorescence emission and theoretical calculations. These studies revealed quantitative singlet excitation energy transfer efficiencies for 1 and 2. Electrochemical studies revealed the strong electron deficient character of these triads and thus electron mobilities of these triads were measured using space charge limited current (SCLC) method. Triads 1 and 2 exhibited appreciable electron mobilities of 2.44 ± 1.70 × 10−3 cm2 V−1 s−1 and 4.00 ± 1.50 × 10−3 cm2 V−1 s−1 respectively, an order of magnitude higher mobility than aza-BODIPY based small molecules reported in the literature. Leveraging upon the dual emission behaviour of these triads, ratiometric FRET sensing as well as ratiometric temperature sensing behaviour were investigated via steady state absorption and fluorescence measurements. Triads 1 and 2 showed remarkable ratiometric FRET-off sensing where the addition of metals such as Co2+ and Fe3+ led to near-quantitative FRET off for both the triads. Triads 1 and 2 also serve as efficient ratiometric temperature sensors with positive temperature coefficients and small temperature sensitivities of ~0.29% °C−1 and ~0.14% °C−1 respectively that suggest the possibility of precise physiological temperature measurements using these triads.
Description:	Only IISERM authors are available in the record.
URI:	https://pubs.rsc.org/en/content/articlelanding/2021/TC/D1TC00068C (https://pubs.rsc.org/en/content/articlelanding/2021/TC/D1TC00068C) http://hdl.handle.net/123456789/4952 (http://hdl.handle.net/123456789/4952)
Appears in Collections:	Research Articles (/jspui/handle/123456789/9)

Files in This Item:

File	Description	Size	Format

Need To Add…Full Text_PDF (/jspui/bitstream/123456789/4952/1/Need%20To%20Add%e2%80%a6Full%20Text_PDF)	15.36 kB	Unknown	View/Open (/jspui/b

Show full item record (/jspui/handle/123456789/4952?mode=full)

(/jspui/handle/123456789/4952/statistics)