

## Unprecedented charge-transfer complex of fused diporphyrin as near-infrared absorption-induced high-aspect-ratio nanorods.

### Autorzy

Balahoju Shivaprasad Achary

Sabapathi Gokulnath

Samrat Ghosh

Madoori Mrinalini

Seelam Prasanthkumar

Lingamallu Giribabu

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### Streszczenie

Charge-transfer (CT) complexes of near-infrared absorbing systems have been unknown until now. Consequently, structural similarities between donor and acceptor are rather important to achieve this phenomenon. Herein, we report electron donors such as non-fused diporphyrin-anthracene (DP), zinc diporphyrin-anthracene (ZnDP) and fused zinc diporphyrin-anthracene (FZnDP) in which FZnDP absorbs in NIR region and permits a CT complex with the electron acceptor, perylene diimide (PDI) in  $\text{CHCl}_3$  exclusively. UV/Vis-NIR absorption,  $^1\text{H}$  NMR, NOESY and powder X-ray diffraction analysis demonstrated that the CT complex formation occurs by  $\pi$ - $\pi$  stacking between perylene units in FZnDP and PDI upon mixing together in a 1:1 molar concentration in  $\text{CHCl}_3$ , unlike non-fused ZnDP and DP. TEM and AFM images revealed that the CT complex initially forms nanospheres leading to nanorods by diffusion of  $\text{CH}_3\text{OH}$  vapors into the  $\text{CHCl}_3$  solution of FZnDP/PDI (1:1 molar ratio). Therefore, these CT nanorods could lead to significant advances in optical, biological and ferroelectric applications.

### Słowa kluczowe

Charge transfer, donor-acceptor systems, fused diporphyrin, nanorods, NIR absorption

### Adres publiczny

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