Axially substituted phosphorous(v) corrole with polycyclic aromatic hydrocarbons: syntheses, X-ray structures, and photoinduced energy and electron transfer studies.

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Rok wydania

2018

Czasopismo

New Journal of Chemistry

Numer woluminu

42

Strony

8230-8240

DOI

10.1039/c7nj04363e

Kolekcja

Naukowa

Język

Angielski

Typ publikacji

Artykuł

Streszczenie

Phosphorous(V) corrole has been employed to build stable, donor-acceptor complexes capable of undergoing photoinduced energy and electron transfer events. Two triads, the first one with naphthalene axial entities (Triad 1) and the second one with pyrene axial entities (Triad 2) were newly synthesized for this purpose. The X-ray structure of the Triad 1 revealed the presence of two naphthalene entities bound to the phosphorous centre without causing steric crowding. The electrochemical and computational studies revealed electron deficient nature of the phosphorous corrole in the triads. Excited state events, monitored by both time-resolved emission and transient absorption studies, revealed several interesting results. In case of Triad 1, efficient energy transfer from singlet excited naphthalene to corrole was observed, however, no photo events from excited phosphorous corrole was evident. Interestingly, in the case of Triad 2, although energy transfer process from singlet excited pyrene to corrole was weak, evidence of photoinduced charge separation leading to the formation of pyrene.+-PC.- was witnessed from femtosecond transient absorption studies when either pyrene or corrole was selectively excited. The importance of axial bound donor entities on phosphorous(V) corrole in promoting photoinduced energy and electron transfer events is borne out from the present study.

Adres publiczny

http://dx.doi.org/10.1039/c7nj04363e

Strona internetowa wydawcy

https://www.rsc.org/