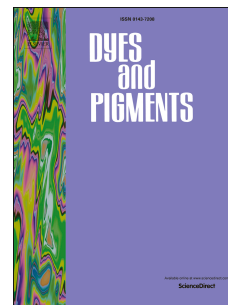


Accepted Manuscript

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PII: S0143-7208(17)30470-9

DOI: [10.1016/j.dyepig.2017.04.032](https://doi.org/10.1016/j.dyepig.2017.04.032)

Reference: DYPI 5929

To appear in: *Dyes and Pigments*

Received Date: 7 March 2017

Revised Date: 18 April 2017

Accepted Date: 18 April 2017

Please cite this article as: Wu X, Xiao J, Sun R, Jia J, Yang J, Shi G, Wang Y, Zhang X, Song Y, Pyrene derivatives as broadband nonlinear optical material: Magnitude and mechanism of transient refraction, *Dyes and Pigments* (2017), doi: 10.1016/j.dyepig.2017.04.032.

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Pyrene derivatives as broadband nonlinear optical material:**magnitude and mechanism of transient refraction**

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Abstract

Two asymmetric pyrene derivatives (E)-1-(4-(dimethylamino)-3-(pyren-1-yl)prop-2-en-1-one) (**DAPP-1**) and (E)-3-(4-(diethylamino)phenyl)-1-(pyren-1-yl)prop-2-en-1-one (**DAPP-2**) were synthesized to access lossless broadband nonlinear refraction. Femtosecond Z-scan from 600 nm to 1030 nm showed positive third-order nonlinear refractive index with high linear transmission (> 90%). Both compounds had ≥ 2.5 figure of merit (F) at 1030 nm, while **DAPP-2** held > 1 F value in a wide spectral region. Mechanism of ultrafast refraction under off & on-resonant regime were investigated via degenerate & non-degenerate pump-probe with phase object, respectively. Results indicate pure response of bound electrons under off-resonance and excited-state enhanced

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