Effect of $–CH_3$/$–NO_2$ substitution on the self-action in azo- and azo-azomethines derivatives polymeric thin films under picosecond laser excitation at 1064 nm

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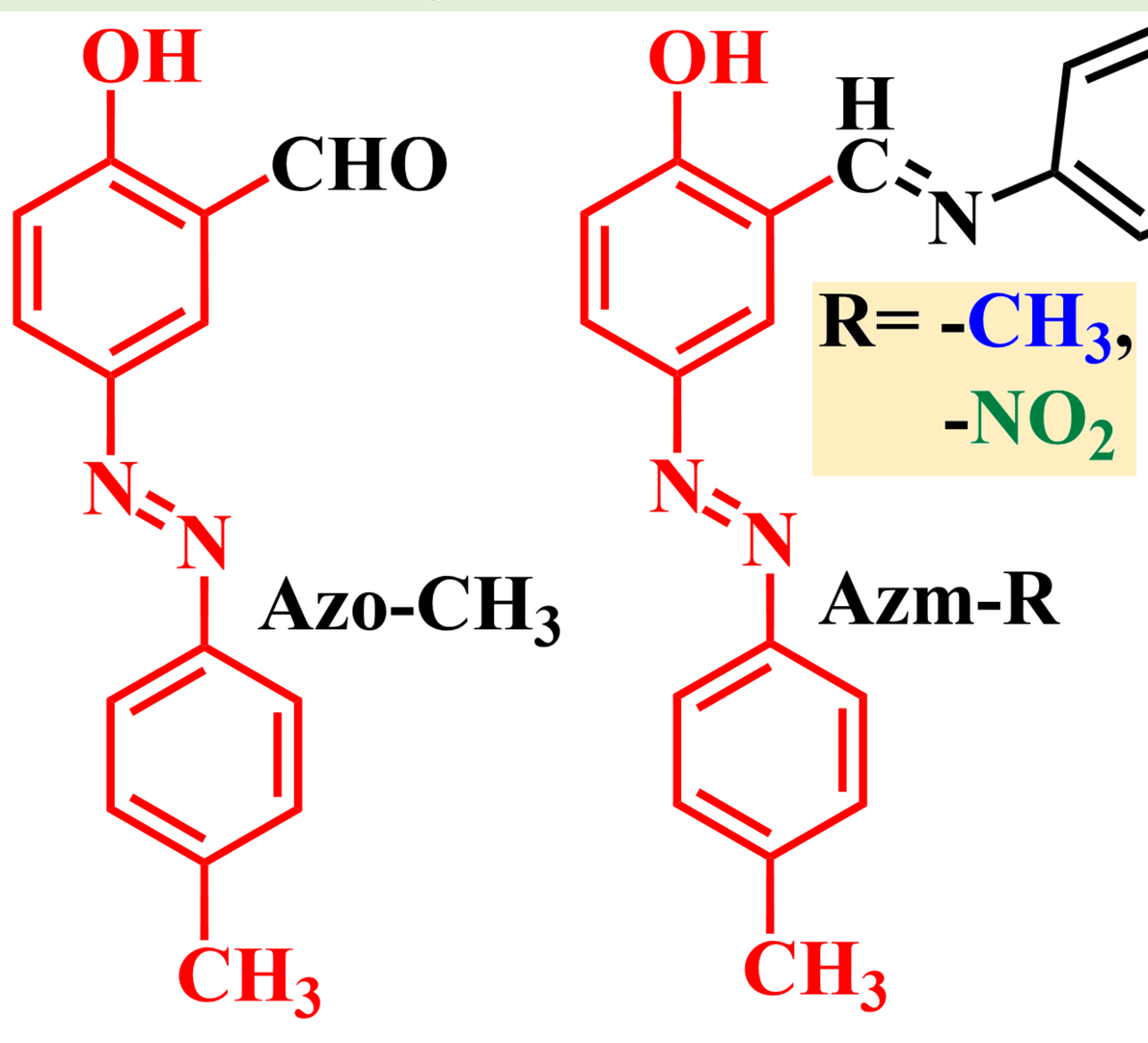
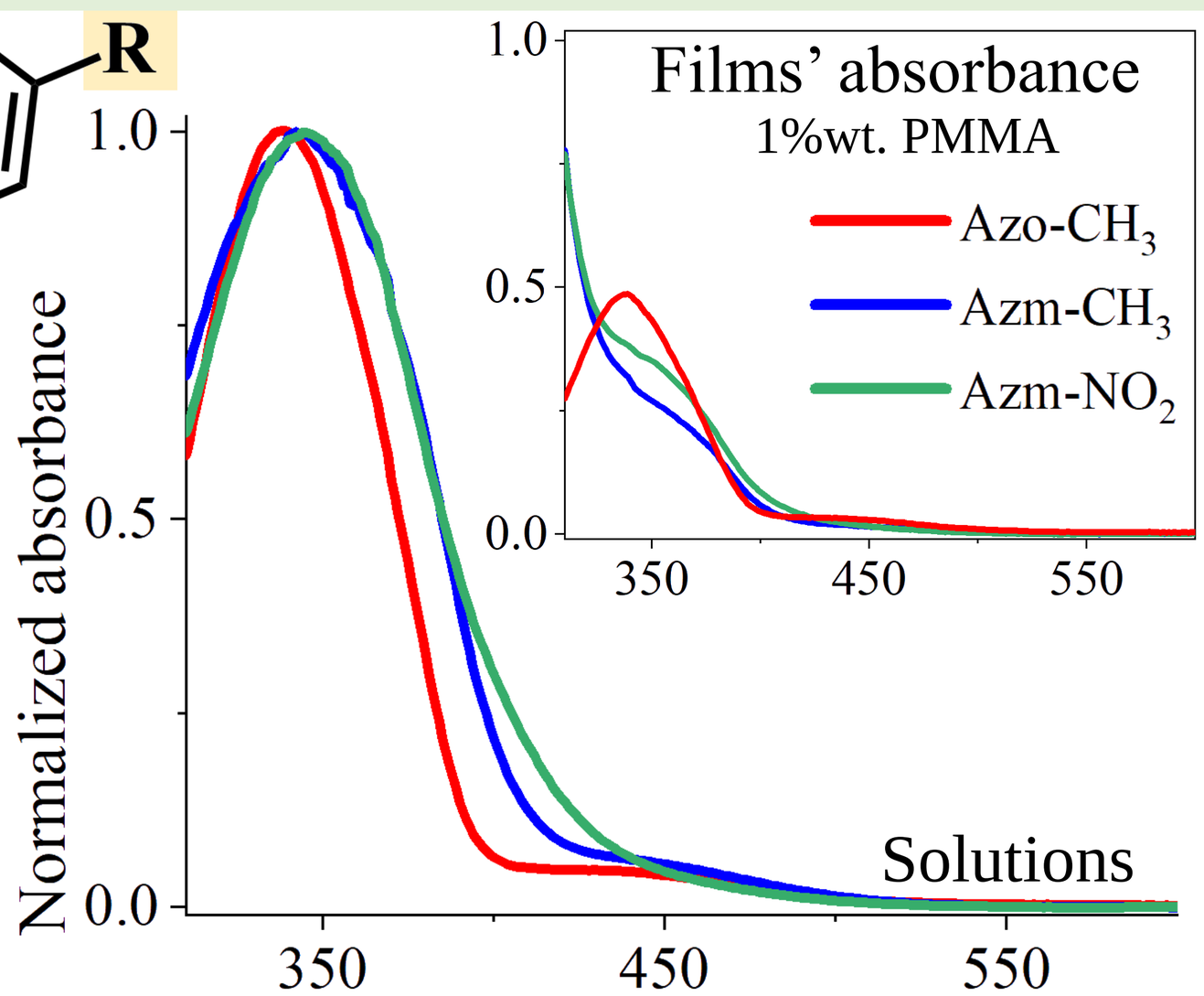
Advanced light-responsive polymeric materials containing –A=B– chromophore groups undergo reversible *trans-cis-trans* photo-isomerization cycle, like –N=N– or –CH=N–, are used in a number of modern electronic photoswitchable systems like sensors, liquid crystal displays [1], elements of optical information storage devices, etc.

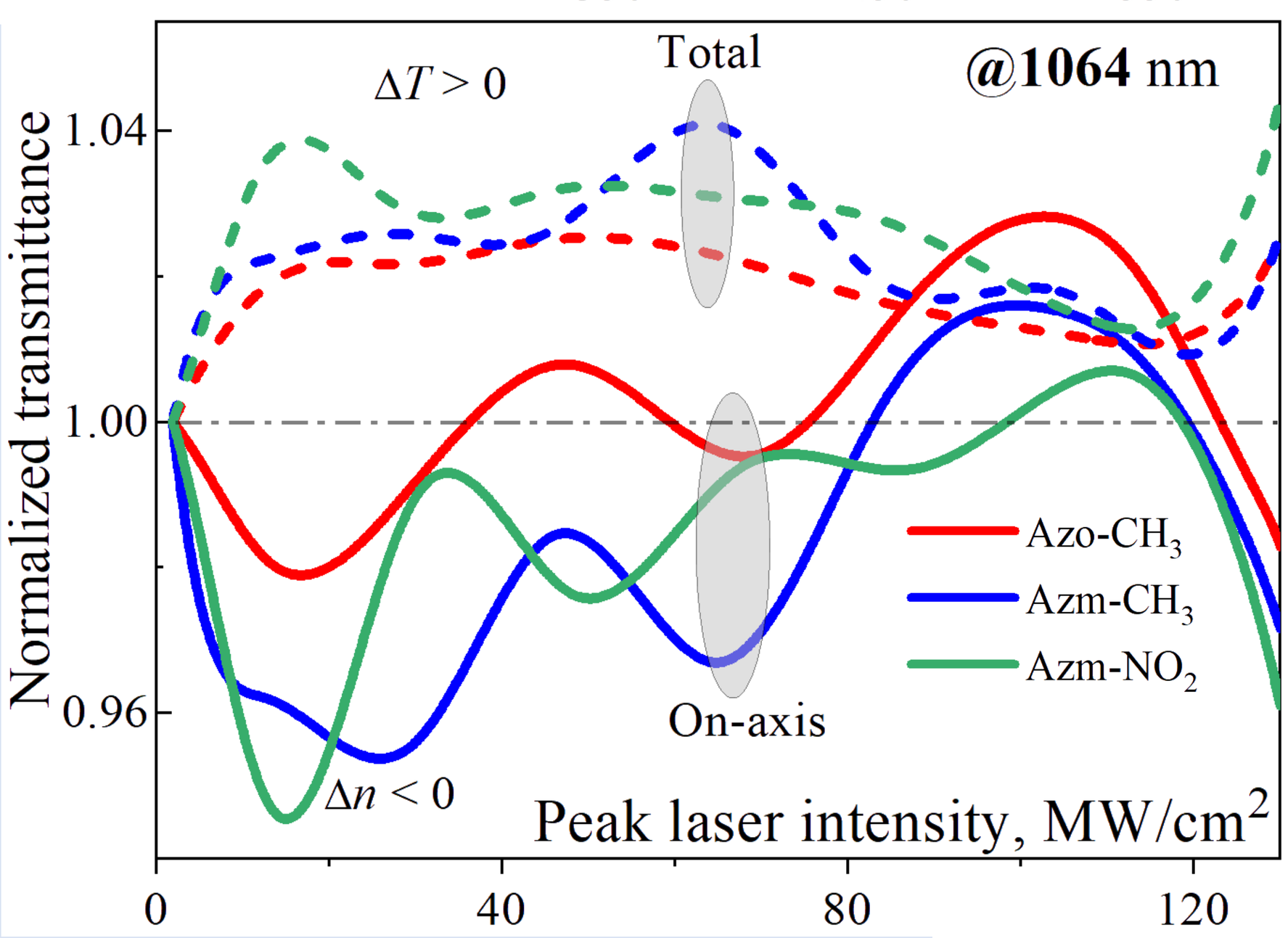




In present work composite "guest-host" films with "guest" azo- (***Azo-CH_3***) or azo-azomethine (***Azm-CH_3*** / ***Azm-NO_2***) and "host" PMMA were prepared. Photoinduced self-action effects in thin films were investigated using pulsed ps laser radiation at wavelength 1064 nm [2].

Conclusions:

1. Initial self-defocusing effect in ***Azo-CH_3*** rose twice after azomethine group incorporation without major donor/acceptor substituents impact. ***Azo-CH_3*** and ***Azm-NO_2*** saturate at lower intensity (I ~ 15 MW/cm^2) than ***Azm-CH_3*** (I ~ 30 MW/cm^2).



2. It was shown: efficiency of the refractive NLO response **$|Re(\chi^{(3)})|$~10^{-8} esu** increases in the following order: ***Azm-NO_2*** > ***Azm-CH_3*** > ***Azo-CH_3***; all the dyes demonstrated slight photobleaching (~2% for ***Azo-CH_3*** and ***Azm-CH_3*** and ~4% for ***Azm-NO_2***) that saturated at about I ~ 25 MW/cm^2.

1. Uklein, A. et al. // Opt. Commun. **296** (2014) P. 79. https://dx.doi.org/10.15407/fm22.01.020

2. Uklein, A. et al. // Appl. Phys. B. **122** (2016) P. 287. https://doi.org/10.1007/s00340-016-6561-2