

**The Photoisomerization and Relaxation Dynamics of a Structurally Modified
Biomimetic Photoswitch**

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Abstract

Recent experimental and theoretical studies on N-alkylated indanylidene pyrroline Schiff bases (NAIP) show that these compounds exhibit biomimetic photoisomerization analogous to that in the chromophore of rhodopsin. The NAIP compounds studied previously isomerize rapidly and often evolve coherently on the ground-electronic surface after reaction. We present the results of transient electronic absorption spectroscopy on dMe-OMe-NAIP, a newly synthesized NAIP analog that differs from other NAIP compounds in the substituents on its pyrrolinium ring. Following excitation with 400 nm light, dMe-OMe-NAIP relaxes from the electronic-excited state in less than 500 fs, which is slower than in other analogues, and does not show the prominent oscillations observed in other NAIP compounds. A reduction in the amount of twisting between the rings caused by removal of the methyl group is likely responsible for the slower isomerization. Measurements in solvents of varying viscosity and structure suggest that intramolecular processes dominate the relaxation of nascent photoproducts.