

Abstract Submitted  
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**Influence of Green Fluorescent Protein (GFP) Nanoparticles on the Optical and Mechanical Properties of Silk in Bio-Nanocomposites with Photonic Properties** SUREEPORN KOOMBHONGSE, RONALD EBY, Dept. of Polymer Science, U. of Akron, SHARON JONES, MARK WALKER, RAJESH NAIK, Air Force Research Laboratory, WPAFB, OH, KATHRYN WAHL, The Naval Research Laboratory — We are examining the influence of Green Fluorescent Protein (GFP) nanoparticles on optical properties and mechanical properties of silk in bio-nanocomposites membranes. Liquid solutions of GFP have previously been shown to exhibit significant intrinsic two-photon absorption, coupled with fluorescent emission in the visible. The nonlinear absorption and emission of GFP have been shown to saturate at high pump intensities, and upconverted lasing of a GFP-doped polymer film has previously been demonstrated. The observed saturation intensity increases cubically with increasing GFP concentration, suggesting that better access to the intrinsic nonlinearity might be possible at higher concentrations than are possible in liquid solution. Silk and GFP solutions were mixed and cast at different concentration. The nonlinear optical properties of these membranes were examined by two-photon absorption measurements using near-infrared femtosecond pulses. Transmission and upconverted fluorescence of focused near-infrared pulses (780nm, 160fs pulsewidth) is being investigated.

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