

Abstract Submitted  
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**Confinement, Ordering, and Optical Properties of Au Nanorods in Polymer Thin Films**<sup>1</sup> MICHAEL J.A. HORE, RUSSELL J. COMPOSTO, Department of Materials Science and Engineering, University of Pennsylvania, Philadelphia, PA 19104 — Gold nanorods (Au NRs) possess interesting optical properties in terms of absorbance and polarization of light that can be further manipulated by controlling their long range order in polymer thin films. We systematically investigate orientational correlations for low aspect ratio ( $L/D = 3.3$ ) Au NRs functionalized with poly(ethylene glycol) (PEG) confined within a poly(methyl methacrylate) (PMMA) film as a function of nanorod volume fraction and PMMA molecular weight. The NR spacing decreases as  $\phi_{rod}^{-0.5}$  whereas the local 2D orientational order parameter increases linearly with  $\phi_{rod}$ , approaching a maximum value of 0.4 at high volume fractions of rods. We compare these results to Au NRs confined in a poly(ethylene oxide) (PEO) thin film as well as simulations of non-interacting rods.

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