

Abstract Submitted  
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**Alignment of Gold Nanorods in Thermoresponsive Hydrogels<sup>1</sup>**

HEUNG-SHIK PARK, OLEG LAVRENTOVICH, Kent State University — The unique optoelectronic properties of the anisotropic metallic nanorods (NRs) are of great interest because of their potential applications in biomedical science, transformative optics and materials science. In order to utilize metallic NRs for the practical devices, the control of orientation and immobilization of NRs in bulk materials are essential. We report an experimental study of gold NR embedded in thermoresponsive gels which can align NRs by volume-contraction transition. When temperature increases, an NR hydrogel stripe experiences an abrupt shrinkage in two lateral (x,y) directions; in the third z-direction, the size remains fixed as the stripe is clamped. The shrunk stripes show high birefringence and anisotropic absorption associated with alignment of the NRs. The alignment of NRs in anisotropically shrunk hydrogels can be achieved also when one uses aggregates of side-by-side preassembled NRs rather than individual NRs. These aggregates can be transferred into a polymer hydrogel preserving their structural and optical features. The hydrogel stripes with preassembled NRs show optical anisotropy opposite to that one of stripes with isolated NRs.

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