

Abstract Submitted
for the MAR16 Meeting of
The American Physical Society

Plasmonic Photopatterning of Complex Molecular Orientations in Liquid Crystals¹ YUBING GUO, MIAO JIANG, CHENHUI PENG, Liquid Crystal Institute, Kent State Univ - Kent, KAI SUN, Department of Material Science, University of Michigan, OLEG YAROSHCHUK, Institute of Physics, National Academy of Sciences of Ukraine, OLEG LAVRENTOVICH, QI-HUO WEI, Liquid Crystal Institute, Kent State Univ - Kent — Aligning liquid crystal (LC) molecules in spatially non-uniform patterns are highly demanded for applications such as programmable origami and liquid crystal enabled nonlinear electrokinetics. We developed a high resolution projection photoalignment technique for patterning arbitrary LC alignment fields. The photoalignment is based on carefully engineered metasurfaces, or dubbed as plasmonic metamasks (PMMs). When illuminated by light, the PMMs generate patterns of both light intensity and polarization. By projecting the light transmitted through the PMMs onto liquid crystal cells coated with photosensitive materials, alignment patterns predesigned in polarization patterns of the PMMs can be imposed in liquid crystals. This technique makes the liquid crystal alignment a repeatable and scalable process similar to conventional photolithography, promising various applications.

¹National Science Foundation CMMI-1436565

Yubing Guo
Liquid Crystal Institute, Kent State Univ - Kent

Date submitted: 06 Nov 2015

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