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Graphene Oxide Liquid Crystals for Reflective Display without Polarizing Optics ZHUAN ZHU, University of Houston, LIQUN HE, University of Science and Technology of China, JIAN YE, Guangdong University of Technology, MIN SHUAI, Texas A&M University, XUFENG ZHOU, Chinese Academy of Sciences, YANAN WANG, YANG LI, ZHIHUA SU, University of Houston, HAIYAN ZHANG, YING CHEN, Guangdong University of Technology, ZHAOPING LIU, Chinese Academy of Sciences, ZHENG DONG CHENG, Texas A&M University, JIMING BAO, University of Houston — The recent emergence of liquid crystals of atomically thin two-dimensional (2D) materials not only has allowed us to explore novel phenomena of macroscopically aligned 2D nanomaterials but also has provided a route toward their controlled assembly into three-dimensional functional macrostructures. Using flow-induced mechanical alignment, we prepared flakes of graphene oxide (GO) in different orientational orders and demonstrated that GO liquid crystal (LC) can be used as a rewritable medium for reflective display without polarizing optics. With a wire or stick as a pen, we can make the surface of GO LC reflective and bright, and we can then manually draw lines, curves, and any other patterns with dark appearance. The contrast between bright and dark features is due to anisotropic optical responses of ordered GO flakes. Since optical anisotropy is an intrinsic property of 2D structures, our observations and demonstration represent one of many potential applications of macroscopically aligned 2D nanomaterials.

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