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**Persistent Photoconductivity in Monolayer MoS<sub>2</sub> on Organic-molecule-functionalized Substrates** WEI-HUA WANG, YUEH-CHUN WU, SHAO-YU CHEN, Institute of Atomic and Molecular Sciences, Academia Sinica, CHENG-HUA LIU, Department of Physics, National Taiwan University, PO-HSUN HO, CHUN-WEI CHEN, Department of Materials Science and Engineering, National Taiwan University, CHI-TE LIANG, Department of Physics, National Taiwan University — We demonstrate a giant persistent photoconductivity (PPC) effect in monolayer MoS<sub>2</sub> in which the photocurrent robustly persists after illumination has ceased. This PPC effect in monolayer MoS<sub>2</sub> on organic-molecule-functionalized substrates sustains up to room temperature and can be highly suppressed by applying source–drain/back-gate voltages to the transistors. Based on this persistency and controllability of the PPC effect, we achieve a room-temperature conductance bistability by utilizing optical and electrical pulses. The observed giant PPC effect in MoS<sub>2</sub> can be attributed to a large electron-capture barrier of trap states, which is estimated to be as high as 390 meV.

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