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X-ray Irradiation Induced Colossal Resistance Change in Pt/TiO2/Pt cellss SEO HYOUNG CHANG, Materials Science Division, Argonne National Laboratory, JUNGHO KIM, Advanced Photon Source, Argonne National Laboratory, SEONG KEUN KIM, CHEOL SEONG HWANG, WCU Hybrid Materials Program, Department of Materials Science and Engineering and Inter-university Semiconductor Research Center, Seoul National Univ., KENNETH D'AQUILA, JEFFREY A. EASTMAN, Materials Science Division, Argonne National Laboratory, JIYOON KIM, Department of Materials Science and Engineering, KAIST, SEUNGBUM HONG, Center for Nanoscale Materials, Argonne National Laboratory and Department of Materials Science and Engineering, KAIST — Interaction between x-ray and matters has been drawing much attention due to its scientific interests as well as technological applications. In particular, synchrotron-based x-ray has been used as a powerful diagnostic tool to unveil nanoscale phenomena in functional materials. However, understanding of how the functional materials respond to the brilliant x-ray is far from complete. Here we report the x-ray-induced colossal resistance change in 40 nm thick TiO_2 films sandwiched by Pt top and bottom electrodes. We observe that the resistance level is modulated in a few orders of magnitude by the intensity of impinging x-ray. In addition, this photovoltaic-like effect can trigger an irreversible resistance change by another few orders of magnitude. We will discuss the physical mechanism behind the emergent phenomenon. Work at the APS, Argonne is supported by a U.S. Department of Energy Office of Science laboratory, is operated under Contract No. DE-AC02-06CH11357.

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