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Observation of ferroelectricity at room temperature in 1 nm thick conducting $BaTiO_{3\delta}$ SEUNGRAN LEE, Max Planck POSTECH/Korea Research Initiative, LKHAGVASUREN BAASANFORJ, University of Science and Technology, Rep of Kor, JUNGWON CHANG, Korea University, Rep. of Kor, INWOONG HWANG, Chungnam University, Rep of Kor, JUNGRAE KIM, Seoul National University, Rep of Kor, SEUNGBO SHIM, Korea Research Institute of Standards and Science, Rep of For, JONGHYUN SONG, Chungnam University, Rep of Kor, JINHEE KIM, Korea Research Institute of Standards and Science, Rep of For — Requirements of multi-functionalities in thin-film systems have led important findings of unique physical character and degree of freedom which only exist in film forms. As growth technique gets advanced, one can decrease the film thickness even $\sim$ nm scale where its unique physical character still appears. Among those intriguing film systems, ferroelectric has been of interest. As a prototype ferroelectric, electrical properties of ultra-thin $BaTiO_3$ (BTO) films have extensively studied, which is found that ferroelectricity sustains down to $\sim$ nm-thick films as theoretically predicted. However, efforts on determination of the minimum thickness in ferroelectric films was hindered by large leakage current. In this study, we used nm-thick BTO films showing metallic-like behaviour around room temperature (RT). Surprisingly, even the 2 unit-cells-thick metallic-like BTO film shows ferroelectric switching behaviour at RT! Observation of such ultra-thin conducting ferroelectric will enlarge its applicable fields leading realization of new functional devices and investigations of further physical phenomena.

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