

Abstract Submitted
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Visualization of oxygen vacancy migration in calcium doped bismuth ferrite films JI SOO LIM, JIN HONG LEE, CHAN-HO YANG, KAIST, CHAN-HO YANG TEAM — Oxygen vacancies are inevitable defects in oxide systems and bring on unexpected functionalities. Configuration of oxygen vacancies is responsible for electronic conduction in resistive switching devices. Motion of oxygen vacancies within materials should be clarified to understand the substitution efficiency of external oxygen ions in solid oxide fuel cell. However, direct observation of oxygen vacancies in motion has been challenging and understanding of their dynamics is not entirely satisfactory. Ca-doped BiFeO₃ (BCFO) is a promising oxide material to investigate the motion of oxygen vacancies [1,2]. As-grown BCFO films spontaneously generate oxygen vacancies to stabilize the oxidation number of Fe³⁺ ions. Application of an external electric field incites to migrate oxygen vacancies with a creation of conducting *p*-type region. We will present how real-time visualization can be utilized to understand the dynamical behavior of oxygen vacancies in an electric field. [1] C.-H. Yang, *et al.* Nature Materials **8**, 485 (2009). [2] J. S. Lim, *et al.* Physical Review B **94**, 035123 (2016)

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