

SrTiO₃ 電気抵抗スイッチングに関する転位の影響Active dislocations for resistance switching in SrTiO₃○陳 君¹、李 建永²、伊藤 俊³、関口 隆史¹ (1. 物材機構、2. 科学技術振興機構、3. 東北大)○Jun Chen¹, Jiangyong Li², Shun Ito³, Takashi Sekiguchi¹ (1.NIMS, 2.JST, 3.Tohoku Unvi.)

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This study attempts to clarify the role of dislocations in the resistance switching phenomenon in Pt/SrTiO₃ Schottky contact. The electrical activities of dislocations in Nb-doped (111) SrTiO₃ substrates have been studied by electron-beam-induced current (EBIC) technique. The nature of dislocations has been analyzed by chemical etching and transmission electron microscopy. Dislocations of screw, edge, and mixed types co-existed and most dislocations have Burgers vectors of $\langle 110 \rangle$ type. Dislocations exhibited dark EBIC contrast at room temperature suggesting the presence of recombination centers. When changing the bias condition or accelerating voltage, bright EBIC contrast has been observed around certain dislocations. It is considered that not all the dislocations contribute to the switching phenomenon. In the presentation, the relation between active dislocation and resistance switching will be discussed.

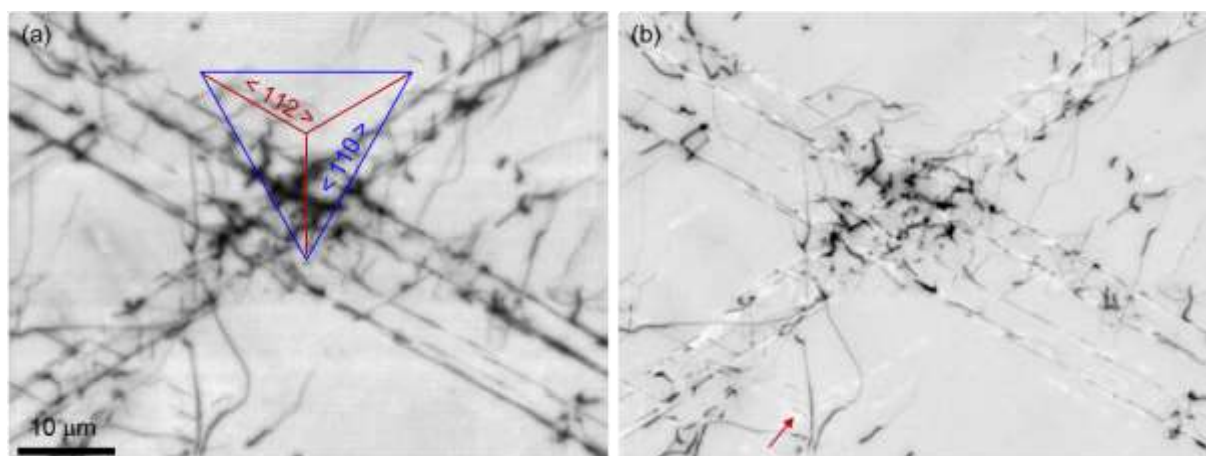


Figure 1. EBIC images of dislocations in SrTiO₃ at zero bias (a) and at -2 V (b). All the dislocations exhibited dark EBIC contrast at zero bias. With the applying of bias, bright contrast appeared in the vicinity of some straight lines with the directions along $\langle 112 \rangle$.