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Structure evolution of the polar $SrTiO_3$(110) surface upon Sr/Ti concentration[1] ZHIMING WANG, KEHUI WU, QINLIN GUO, JIANDONG GUO, Institute of Physics, Chinese Academy of Sciences — In the artificial oxide heterostructures, the atom arrangement at the interface may be determinant for the property [1]. To study the lattice and electronic structures of $SrTiO_3$ surface at the atomic scale is important since it has been extensively used as a template for the growth of functional oxide materials. We report the investigation on the structure of the polar $SrTiO_3$ (110) surface treated by Ar ion sputtering followed by annealing in ultra high vacuum. Tow types of termination are obtained and their relative ratio is tuned by varying the sputtering dose or the Sr/Ti metal adsorption. The tuning mechanism is revealed as a chemical content driven process that is also responsible for the charge compensation on the polar surface. Further changing the relative concentration of Sr and Ti induces the formation of different surface reconstructions.

[1] A. Ohtomo and H. Y. Hwang, Nature 427, 423 (2004).

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