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Intermediate surface structure between step bunching and step flow in SrRuO₃ thin film growth GIULIA BERTINO, ANNA GURA, MATTHEW DAWBER, Stony Brook University — We performed a systematic study of SrRuO₃ thin films grown on TiO₂ terminated SrTiO₃ substrates using off-axis magnetron sputtering. We investigated the step bunching formation and the evolution of the SRO film morphology by varying the step size of the substrate, the growth temperature and the film thickness. The thin films were characterized using Atomic Force Microscopy and X-Ray Diffraction. We identified single and multiple step bunching and step flow growth regimes as a function of the growth parameters. Also, we clearly observe a stronger influence of the step size of the substrate on the evolution of the SRO film surface with respect to the other growth parameters. Remarkably, we observe the formation of a smooth, regular and uniform “fish skin” structure at the transition between one regime and another. We believe that the fish skin structure results from the merging of 2D flat islands predicted by previous models. The direct observation of this transition structure allows us to better understand how and when step bunching develops in the growth of SrRuO₃ thin films.

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