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The dead layer in La0.67Sr0.33MnO3 thin films HANS BOSCHKER, JAAP KAUTZ, MARK HUIJBEN, Mesa+ Institute for Nanotechnology, JO VERBEECK, RICARDO EGOAVIL, SARA BALS, STAF VAN TENDELOO, EMAT Antwerp, GERTJAN KOSTER, DAVE BLANK, GUUS RIJNDERS, Mesa+ Institute for Nanotechnology, MESA+ TEAM, EMAT TEAM — La0.67Sr0.33MnO3 (LSMO) films have an interfacial dead layer that is attributed to either changes in the Mn valence state at the interface, a change in the Mn orbital ordering at the interface or a change in the magnetic exchange interaction due to a structural reconstruction at the interface. We studied the dead layer in LSMO films grown on SrTiO3 (STO) substrates. To directly compare the effect of the polar discontinuity on the dead layer, we removed the polar discontinuity by compositional interface engineering. We also studied films in the (110) direction. We found the presence of the dead layer in all types of films and interface configurations. The LSMO (001) samples with compositional interface engineering have the thinnest dead layer (2 nm). Using electron energy loss spectroscopy, we found no deviations in the Mn valence state at the interface. Using linear dichroism in x-ray absorption spectroscopy, we also found no deviations in the orbital ordering. Therefore, we suggest that the dead layer is caused by the structural reconstruction at the interface. An outlook towards preventing the structural reconstruction and further improving the interfacial properties of the LSMO thin films will be given.

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