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Inhomogeneity at the LaAlO₃/SrTiO₃ interface T. CLAESON, A. KALABUKHOV, R. GUNNARSSON, D. WINKLER, J. BORJESSON, N. LJUSTINA, E. OLSSON, Chalmers Univ.Techn., Goteborg, Sweden, V. POPOK, Goteborg Univ., Sweden, YU. BOIKOV, I. SERENKOV, V. SAKHAROV, Ioffe Phys.-Techn. Inst., St Petersburg, Russian Federation, CHALMERS UNIV. TECHN., GOTEBOG, SWEDEN TEAM, IOFFE PHYS.-TECHN. INST., ST PETERSBURG, RUSSIAN FEDERATION TEAM — High electrical conductivity has been reported for the interface between two wide-band gap insulators, LaAlO₃ (LAO) and SrTiO₃ (STO). It occurs above a critical thickness of LAO and can be tuned by an electric field. The conduction has been attributed to i) “polar catastrophe”, where the electrostatic charge at the interface is compensated by the transfer of half an electron per unit cell to the interface, ii) oxygen vacancies in the STO, and iii) cation intermixing, which may result in the formation of metallic La_{1-x}Sr_xTiO₃ layer. The relation between microstructure and electrical properties is crucial for understanding the origin of electrical conductivity. We have investigated the interface composition using medium-energy ion spectroscopy, high resolution electron microscopy, and Kelvin probe force microscopy. We find a correlation between cationic intermixing at the interface and electrical properties and inhomogeneities of the interface conductivity that may support a percolation model. Work supported by Swedish VR & KAW, Russian ISTC 3743, EC NANOXIDE

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