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Colossal ionic conductivity at ZrO_2:Y_2O_3 /$SrTiO_3$ interfaces JACOBO SANTAMARIA, J. GARCIA BARRIOCANAL, A. RIVERA CALZADA, Z. SEFRIOUI, C. LEON, GFMC, Universidad Complutense de Madrid, Madrid 28040, Spain, E. IBORRA, Universidad Politécnica de Madrid. Madrid 28040, Spain., M. VARELA, S.J. PENNYCOOK, Materials Science & Technology Division, Oak Ridge National Laboratory, Oak Ridge, TN 37831, USA — We describe the strong enhancement of the conductivity occurring at the interfaces of superlattices made by alternating 10 nm strontium titanate and 1 nm yttria stabilized zirconia [1]layers. Conductivity is found to be as high as 0.014 S/cm at 357 K, with a substantial decrease of the activation energy for the dc ionic conductivity from 1.1 eV down to 0.64 eV. EELS analysis is consistent with a large number of interfacial oxygen vacancies and high disorder in the interface oxygen plane between YSZ and STO layers. Our results demonstrate that the design of suitable heterogeneous interfaces in epitaxial heterostructures might have important implications in the search of artificial nanostructures with high ionic conductivity. Work at UCM and UPM supported by MCINN MAT2008 6517and Division of Materials Sciences and Engineering of the US Department of Energy. [1] J. Garcia-Barriocanal, et al. Science ***321***, 676 (2008)

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