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Correlations Between Thin-Film Manganite Morphology, Phase Separation, and Dead Surface Layers Investigated with STM[1] SIMON KELLY, FEDERICA GALLI, IVAN KOMISSAROV, JAN AARTS, Univ of Leiden — Thin-film colossal magnetoresistance manganites such as $La_{0.67}Ca_{0.33}MnO_3$ (LCMO) have now been intensely studied for more than a decade, but the issue of possible nanoscale electronic phase separation remains unresolved. Scanning Tunneling Microscopy / Spectroscopy (STS) has been pivotal in studying phase separation, but is hindered by being surface- rather than bulk-sensitive. For our sputtered LCMO films the data indicates a strong correlation between surface morphology and phase separation; rough films are phase separated while atomically flat films are homogeneous but have a more or less inactive surface layer. Regardless of surface morphology, the film-bulk is electronically and magnetically active. Many of the reported conclusions about electronic inhomogeneities measured by STS have been confused by this issue.

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