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1/f noise in micrometer-sized ultrathin ITO films SHENG-SHIUAN YEH, WEI-MING HSU, JUI-KAN LEE, NCTU-RIKEN Joint Research Laboratory and Institute of Physics, National Chiao Tung University, Taiwan, YAO-JEN LEE, National Nano Device Laboratories, Taiwan, JUHN-JONG LIN, NCTU-RIKEN Joint Research Laboratory and Institute of Physics, National Chiao Tung University, Taiwan — By employing the ac bridge technique, we have measured the low frequency noises of micrometer-sized ultrathin indium tin oxide (ITO) films at room temperature to investigate the effect of post thermal annealing on the noise level. The noises in all the samples studied reveal an approximate $1/f$ form in the frequency range $f \approx 0.1\text{--}20$ Hz. The microstructures and grain sizes of our films were altered by adjusting the thermal annealing conditions. An enhancement of the noise level was observed for those samples comprising smaller grains, where larger amounts of grain boundaries exist. This enhancement in the noise level may be ascribed to atomic diffusion along grain boundaries or dynamics of two-level-systems near the grain boundaries.

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