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**Effects of Aging and Humidity on Low-Frequency Noise of Metal-Oxide-Semiconductor (MOS) Transistors** ARITRA DASGUPTA, Department of Physics & Astronomy, S.A. FRANCIS, Department of Electrical Engineering and Computer Science, D.M. FLEETWOOD, Department of Electrical Engineering and Computer Science, Vanderbilt University — Low frequency noise measurements can provide a non-destructive method of measuring radiation hardness and/or reliability of MOS transistors. We have been studying the effects of moisture exposure at elevated temperatures on MOS low frequency noise. The devices under test were manufactured in the 1980s and came from two different process lots. The results show that the normalized  $1/f$  noise magnitudes  $K$  of the pMOS transistors increased significantly with exposure to humidity at elevated temperatures, while the changes in the  $1/f$  noise magnitudes of the nMOS transistors were mostly much less. To estimate the energy dependence of the defects responsible for the noise, we evaluated the gate voltage dependence ( $V_g - V_t$ ) of the noise, where  $V_t$  is the threshold voltage. We find, for the pMOS transistors,  $S_{vd} \sim (V_g - V_t)^{-1}$ , whereas, for the humidity exposed nMOS transistors,  $S_{vd} \sim (V_g - V_t)^{-1.25}$ . These deviations from an inverse square gate voltage dependence indicate a strong energy dependence of the defect distribution due to humidity exposure.

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