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Reversible Superconductivity in Electrochromic Indium-Tin Oxide Films ALI ALIEV, Alan G. MacDiarmid NanoTech Institute, University of Texas at Dallas, Richardson, TX, 75083, MIRON SALAMON, Department of Physics, University of Texas at Dallas, Richardson, TX, 75083 — Transparent conductive indium tin oxide (ITO) thin films, electrochemically intercalated with sodium or other cations, show tunable superconducting transitions with a maximum T_c at 5 K. The transition temperature and the density of states, $D(E_F)$ (extracted from the measured Pauli susceptibility χ^p) exhibit the same dome shaped behavior as a function of electron density. Optimally intercalated samples have an upper critical field $\approx$ 4 T and $\Delta/k_B T_c \approx 2.0$. Accompanying the development of superconductivity, the films show a reversible electrochromic change from transparent to colored and are partially transparent (orange) at the peak of the superconducting dome. This reversible intercalation of alkali and alkali earth ions into thin ITO films opens new opportunities for tunable, optically transparent superconductors.

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