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Ionic Liquid Gated Vanadium Oxide Three Terminal Devices: Chemical Stability and Field Effect[1] YOU ZHOU, ZHENG YANG, SHRIRAM RAMANATHAN, Harvard University — Understanding electrostatic field effect in correlated oxides is one approach to uncovering mechanisms leading to metal-insulator transition and further is of great interest in oxide-based device technologies. We have fabricated ionic liquid gated VO_2 three-terminal devices. The VO_2/IL interface properties were systematically studied with emphasis on electrochemical stability, gate capacitance and charging/discharging using photoelectron spectroscopy, impedance spectroscopy and other electrical characterization. We have observed a large modulation of VO_2 channel conductance at room temperature with polarity dependence. Interestingly, the conductance modulation also exhibits a time-dependent response to external gate bias and possible mechanisms will be discussed.

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