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Controlling Oxygen Vacancy Creation In Ionic Liquid Gated Vanadate Nanostructures COLIN KILCOYNE, SUJAY SINGH, State Univ of NY - Buffalo, GREGORY HORROCKS, PETER MARLEY, SARBAJIT BANERJEE, Texas AM University, College Station, G. SAMBANDAMURTHY, State Univ of NY - Buffalo — Vanadium dioxide (VO_2) is a correlated material with a transition from a monoclinic insulator to a rutile metal at $\sim$ 340 K. Through ionic liquid gating, oxygen vacancies can be electrochemically induced in VO_2 and it is found that the vacancies formation is greatly facilitated in the rutile phase, leading to the suppression of the metal-insulator transition. The reversibility, the rate and kinetics of the electrochemical reaction can be readily controlled with the gate voltage sweeps suggesting a potential defect engineering route to tune the electrical and structural properties of VO_2. Vanadium pentoxide (V_2O_5) is a related system with diverse structural and electronic phases that can be obtained by intercalation of various cations. The electrochemical role of ionic liquid gating in creating new phases and modulating conductance in exfoliated thin flakes of V_2O_5 will also be presented. This work is supported by NSF DMR 0847324.

Colin Kilcoyne
State Univ of NY - Buffalo

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