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Tuning the charge ordering transitions in single nanobeams of Cu-doped vanadium pentoxide G. SAMBANDAMURTHY, SUJAY SINGH, Department of Physics, University at Buffalo-SUNY, PETER MARLEY, SARBAJIT BANERJEE, Department of Chemistry, University at Buffalo-SUNY, Buffalo, NY 14260, USA — Vanadium oxide bronze phases derived from the intercalation of metal ions (K, Pb, Cu, Ag) within V_2O_5 frameworks exhibit remarkable physical properties such as charge ordering, quantum spin phenomena and metal-insulator transitions. The intercalated ions typically alter the electronic and geometric structure of these strongly correlated materials and this opens up avenues to observe interesting phases and to tune transitions between them using a variety of external parameters. In this work, results from electrical transport measurements on single crystalline, individual nanobeams of Cu-doped vanadium pentoxide will be presented. The nanobeams undergo a metal to an insulator transition (MIT), possibly due to charge ordering, below room temperature (T_C values depend on Cu doping levels). The charge ordered state can be progressively altered by applying an electric field and/or ionic liquid gating. The role of oxygen migration in the presence of ionic liquid and its effect on the transport characteristics will be discussed. The work is supported by NSF DMR 0847324, 0847169 and Intel Corporation.

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