

Abstract Submitted
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Nanoscale control of the metal insulator transition in vanadium oxides using focused ion beam irradiation - fundamental and application perspectives¹ YOAV KALCHEIM, JUAN TRASTOY, JAVIER DEL VALLE, ILYA VALMIANSKI, IVAN SCHULLER, University of California San Diego, IVAN SCHULLER GROUP TEAM — Vanadium oxides have long been the focus of intensive research aiming to understand the underlying mechanism of their metal-insulator transitions. These materials are also of interest for applications such as memory devices, bolometers, meta-materials and more. In this study we show that using focused Ga ion irradiation it is possible to suppress the metal-insulator transition with nanometric scale resolution. Aside for shedding light on the mechanism of suppression, this permits the spatial study of the effect of irradiation as well as single step lithography to produce wires of tunable connectivity. Using this technique with deep penetrating ions, it would also be possible to create 3-dimensional wiring patterns in a single lithographic step, with potentially important implications for neuromorphic computation.

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