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**Novel devices in $VO_2$ nanobeams**[1] JIANG WEI, JAE HYUNG PARK, JACOB BEEDLE, GEETA YADAV, ZENGHUI WANG, DAVID COBDEN, Department of Physics, University of Washington, MARCO ROLANDI, Materials Science & Engineering, University of Washington — Working with nanobeams and sheets of vanadium dioxide attached to a rigid substrate, one can avoid the difficulties associated with multiple domains and sample degradation that occur in the bulk material due to the first-order metal insulator transition. Taking advantage of this, we illustrate the possible uses of single-crystal nanobeams and sheets for making new kinds of nanoelectronic devices and switches. For switching, one can exploit the instabilities due to coupling between the metal-insulator transition and mechanical buckling or the supercooling of the metallic phase. For nanoelectronic devices we explore the patterning of a conducting layer on the surface by controlled reduction and oxidation using conducting atomic force microscopy.

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