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Strain control and the triple point of the metal-insulator transition in vanadium dioxide[1] JAE HYUNG PARK, JIM COY, SERKAN KASIRGA, ZAIYAO FEI, CHUNMING HUANG, DAVID COBDEN, University of Washington — We have developed an apparatus for applying controlled strain to suspended nanostructures while carrying out optical and transport measurements. This platform enables us to control and study phenomena where strain plays a key role, such as the metal-insulator transition in vanadium dioxide. The relationship between the metallic (R) phase and the two insulating (M1 and M2) phases involved in this first-order solid-state transition remains intriguing. Due to the different lattice constants of the phases, controlling the length of a VO2 nanobeam allows us to study the transitions between them methodically as a function of temperature and strain. One of our findings is that the triple point temperature of these three phases is extremely close to the transition temperature at zero strain, suggesting that the balance between M1 and M2 controls the stability of the metallic phase.

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