Abstract Submitted
for the MAR12 Meeting of
The American Physical Society

Metal-insulator transition in VO2 macro single domain crystals due to phase boundary motion HONGLYOUL JU, Physics Dept., Yonsei Univ., BONGJIN MUN, Applied Physics Dept., Hanyang Univ., KAI CHEN, Advanced Light Source, LBNL & CAMP-Nano, Xi'an Jiaotong Univ., CATHERINE DEJOIE, NOBUMICHI TAMURA, MARTIN KUNZ, ZHI LIU, SUNG-KWAN MO, Advanced Light Source, LBNL, JOONSEOK YOON, Physics Dept., Yonsei Univ., CHANG-WOO PARK, Hanbat National Univ. & Advanced Nano Products —
Metal insulator transition (MIT) characteristics of macro-size VO_2 single domain crystals, exhibiting a high resistance ratio of $\sim 10^5$ within as small as-10^{-3} °C in the vicinity of MIT temperature, were investigated by temperature-dependent electrical transport, optical microscopy, and synchrotron-based polychromatic x-ray micro-diffraction measurements. Our results clearly show that MIT initiated via inhomogeneous nucleation, proceeds with the propagation of sharp phase boundary between the metallic (R) and insulating (M1) phases, along the rutile c axis. In this talk, we will present evidences of MIT of single domain VO_2 crystals with sharp phase boundary motion and discuss the implications of our findings on to the origin of MIT and related phenomena.

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Date submitted: 18 Nov 2011 Electronic form version 1.4