

Measurement and Modeling of the Thermal Properties' Hysteresis of VO₂ Films

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Abstract

Hysteresis loops exhibited by the thermal properties of VO₂ thin films are experimentally measured and theoretically modeled. This is achieved by directly measuring through photothermal radiometry the thermal diffusivity and thermal effusivity of the VO₂ samples during their heating and cooling processes across their phase transitions. These thermal properties are then used to determine the thermal conductivity and volumetric heat capacity of the VO₂ samples. A significant enhancement of the VO₂ thermal conductivity is observed during the heating process, while its volumetric heat capacity exhibits a sharp peak at the middle of the phase transition. The temperature variations of these two latter properties are accurately described by means of an explicit expression derived for the temperature evolution of the volume fractions of the metallic and isolating domains appearing during the heating and cooling of VO₂, respectively.

Seminario

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Sala Riunioni, ore 9.30-12 e 14-16.30

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