텅스텐 첨가에 의한 적외선 소자용 바나듐 옥사이드의 특성 향상
Improvement of bolometric properties of vanadium oxide by addition of tungsten

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Uncooled infrared(IR) detectors that use a microbolometer with a large focal-plane array(FPA) have been developed with surface micromachining technology. There are many materials for microbolometers, such as metals, vanadium oxide, semiconductors and superconductors. Among theses, vanadium oxide is a promising material for uncooled microbolometers due to it high temperature coefficient of resistance(TCR) at room temperature. It is, however, is very difficult to deposit vanadium oxide thin films having a high TCR and low resistance because of the process limits in microbolometer fabrication. In general, vanadium oxides have been applied to microbolometer in mixed phases formed by ion beam deposition methods at low temperature with TCR in the range from –1.5 to –2.0 %/K.

In this work, we present a novel fabrication method for bolometric vanadium oxide thin films by conventional sputtering and low temperature oxidation. Tungsten was co-sputtered with vanadium by argon plasma and deposited vanadium-tungsten metal was annealed at 300 °C in air for various times for oxidation of vanadium-tungsten metal. As the results, we have obtained the improved bolometeric properties of vanadium oxide. TCR over –3.0 %/K at very low process temperature was achieved and it is very remarkable result of the reported values in the world.