

Mott Transition in the VO₂/LSCO Heterojunction

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Abstract : In this study, p-n heterojunctions with La_{0.5}Sr_{0.5}CoO₃ (LSCO) and W-doped VO₂ thin films were fabricated by the radio frequency (r.f.) magnetron sputtering technique and sol-gel process, respectively. The thickness of VO₂ and LSCO thin films are about 40 nm and 400 nm, respectively. Good crystalline match between LSCO and VO₂ films was observed from the SEM. The built-in voltages for the junction are about 1.1 V and 2.3 V for the sample in the metallic and insulating state, respectively. The sample can undergo the current induced MIT during applying field when the sample was heated at 40 and 50°C. This is in agreement with the value obtained from the difference in the work functions of LSCO and VO₂. The band structure of the heterojunction was proposed based on the results of analysis.

Keywords : hetrojection, Mott transition, switching , VO₂

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