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Electrical Properties of the Transparent Conducting Oxide Layers of Al-doped ZnO and WO₃ Prepared by rf Sputtering Process

강동수¹, 김희성², 이봉주¹, 신백균²

남서울대학교 전자공학과¹, 인하대학교 전기공학과²

Two different transparent conducting oxide (TCO) layers of Al-doped ZnO (AZO) and WO₃ were prepared by a rf sputtering process. Working pressure, deposition time, and target-to-substrate distance were varied for the sputtering process to improve electrical properties of the resulting layer. Thickness of the TCO layers was measured by a profile meter of α -step. To evaluate the electrical conductivity, surface resistivity of the TCO layers was measured by a four-point probe technique. Decrease of the working pressure resulted in increase of deposition rate and decrease of surface resistivity of the resulting layer. Increase of the layer thickness due to increased deposition time resulted in decrease of surface resistivity of the resulting layer. The shorter the target-to-substrate distance was, the lower was the surface resistivity of the resulting layer.

Keywords: transparent conducting oxide, Al-doped ZnO, WO₃, rf sputtering, surface resistivity