CMP 공정을 통한 표면 특성 개선에 의한 CeO_2 산소 센서 감도 향상 연구

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Sensitivity improvement of CeO_2 oxygen sensor by betterment of surface characteristics through chemical mechanical polishing process

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Abstract : Microstructure and surface roughness of the sensing materials should be improved to use them in advanced sensor applications because the uneven surface roughness degrades the light reflection, pattern resolution, and devices performance. Chemical mechanical polishing (CMP) processing was selected for improving the surface roughness of CeO_2 which is one of the well known materials for the oxygen gas sensors. Surface roughness and removal rate of spin coated CeO_2 thin films were examined with a change of CMP process parameters such as down force and table speed. The optimized process condition, reflected by the surface roughness with the hillock-free surface as well as the excellent removal rate with the good uniformity, was obtained. The effects of the improved surface roughness on the sensing property of CeO_2 thin films were also confirmed. The improved sensitivity of CeO_2 thin films for oxygen sensors were obtained after CMP process by the improved surface characteristics. Therefore, we conclude that sensing property of CeO_2 thin film is strongly dependent on the surface roughness of CeO_2 thin films by using CMP process.

Key Words : CeO_2, Oxygen Sensor, Chemical mechanical polishing (CMP)

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