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Structural, electrical and gas sensing properties of Ag doped LaCoO3 nanowires deposited by reactive magnetron sputtering

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The perovskite oxides of general formula ABO_3, where A is an alkali, alkaline earth or lanthanide metal and B is a transition metal, have attracted the interest of many scientists and have been the subject of intensive investigations mainly because of their particular characteristics. Among these oxides, lanthanum cobaltites ($LaCoO_3$) are extremely promising in various fields and applications such as superconductors, magnetic coatings and especially as gas sensors due to their high electrical conductivity and their excellent electrocatalytic activity. To improve the catalytic and sensing activities of $LaCoO_3$ oxide, two solutions are proposed in the literature: substitution on the A-site of $LaCoO_3$ due to simultaneous formation of structural defects and increase of specific surface area.
In this paper, $La_{1-x}Ag_xCoO_{3-\alpha}$coatings are deposited by reactive magnetron sputtering. First part will be dedicated to the chemical, microstructural and structural characterization (SEM, XRD …) of the coatings as a function of the film composition. Hall effect measurements are used to investigate the electrical resistivity, free carrier concentration and mobility in the coatings in a temperature range from 293 K to 573 K. Finally, the performance as dodecane-sensor of these coatings will be discussed depending on dodecane concentration and sensitive surface's temperature.

Keywords
Sputtering
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Dodecane sensor