First part of this thesis is focused on magnetron sputtering deposited layers of cerium oxide using carbonaceous substrates. Micrographs from scanning and transmission electron microscopes reveal that cerium oxide layers exhibit remarkable roughness and nano-porosity. In this work there are presented optimized key preparation parameters for growth of highly nano-porous layers of cerium oxide on amorphous graphite as well as on graphite foil. The effect of residual atmosphere during the magnetron sputtering deposition is discussed. Results of deposition using oxygen/argon mixture as working gas are presented. A simple growth model is formulated and discussed.
Second part deals with utilization of cerium and tungsten oxides as conductometric gas sensors. A testing station was constructed for gathering sensorial properties of such devices. The construction and abilities of the measuring system designed by the author are noted. Preliminary results of measurements of response to hydrogen are presented. Cerium oxide layers suprisingly exhibit measurable response to hydrogen gas. Tungsten oxide nanowires grown on mica substrate were formed into gas sensor via electron beam lithography and show high sensitivity.