Abstract: Black metallic thin films are characterized by their excessively rough fractal-like surface structure. Furthermore, black metal films have a much bigger surface-to-volume ratio compared to classic reflective metals. Therefore, they can be used e.g. as a basis for optical or chemical sensors. In the present bachelor thesis, we study and provide a comparison between the properties of reflective and black thin films with thickness in the range of 50–700 nm prepared by pulsed DC magnetron sputtering. A small amount of nitrogen that is introduced during deposition to a chamber is responsible for a change in the structure and the growth of the black films. Different surface morphology is studied using a contact profilometer, atomic force microscope and scanning electron microscope. The measurements obtained by these instruments provide valuable information regarding the overall surface structure and means of growth. The surface roughness, as well as the mean crystallite size was observed to increase with the thickness of the films. The X-ray diffraction analysis shows that both types of film crystallize in the face-centered cubic crystal structure. Spectrophotometrical measurements of specular reflectance provide quantitative information about the optical properties. The ultraviolet, visible and near-infrared regions show a reflectivity of only about a few percent for black aluminium films. The incident light is effectively absorbed on their surface, in contrast to reflective layers with very high reflectivity.