

The aim of this diploma thesis was to study the Heusler compounds using both optical and magneto-optical (MO) methods. In the case of the first compound, $\text{Co}_2\text{FeGa}_{0.5}\text{Ge}_{0.5}$, we have studied the presence of the structural disorder phenomena by the means of spectroscopic ellipsometry, MO spectroscopy and MO Kerr magnetometry. The experimental results were confronted with theoretical models. We have also provided the complementary results of our collaborators, including X-ray diffraction, atomic-force microscopy and ab initio calculations, in order to support our interpretation of obtained data. We have found that the structural disorder is indeed observable with the help of the methods we have employed. This was explained via the differences in the band structure of structurally ordered and disordered samples. In the case of the second compound, Fe_2MnGa , we have investigated the influence of the Fe content on the overall optical and MO properties of the material. We have found that the iron atoms influence free carrier concentration of the alloy making it metallic comparing to Ni_2MnGa and increasing optical and MO response in the near infrared region of the spectrum. The sample with the highest content of iron has been found to possess zero magnetization.