

Abstract: This bachelor thesis is focused on the characterization of  $\text{Yb}_2\text{AlSi}_2$  compound crystalizing in  $\text{Mo}_2\text{FeB}_2$ -type tetragonal structure. In compounds containing Yb, Ce and U, we can often observe exotic electron features and behaviour, such as non-integer valence, heavy-fermion behaviour or unconventional superconductivity. These properties have the origin in the strong Coulomb interaction in 4f shell and in the hybridization of the f-electron states with conduction electrons. Previous studies were carried out only for polycrystalline samples. The temperature dependence of lattice parameters, electric transport properties, magnetization and heat capacity in external magnetic fields performed on a successfully grown single-crystal are reported in this work. Measurements were done with respect to anisotropy. No trace of any phase transition such as magnetic ordering or superconductivity has been observed. From magnetic measurements the non-integer valence  $2.48+$  for ytterbium was found. The large, negative  $\theta_p^a = -216$  K for magnetic field applied along  $a$  ( $\theta_p^c = -354$  K for field along  $c$ ) is a characteristic feature of spin/valence fluctuations. In the study of resistivity, interesting anomaly in current flow along lattice parameter  $a$  at temperatures between 150 and 300 K was observed. Another interesting anomaly appears in specific heat temperature dependence below 15 K. Observation of this anomaly together with the enhanced value  $\gamma_0 = 153 \text{ mJ mol}^{-1}\text{K}^{-2}$  are typical for presence of the heavy fermion ground state of  $\text{Yb}_2\text{AlSi}_2$ .