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## Study of upper critical magnetic field of superconducting HoMo<sub>6</sub>Se<sub>8</sub>

**Tadesse Desta**

Addis Ababa University, Ethiopia

This work focuses on the study of mathematical aspects of upper critical magnetic field of superconducting HoMo<sub>6</sub>Se<sub>8</sub>. At zero external magnetic field, HoMo<sub>6</sub>Se<sub>8</sub> was found to undergo a transition from the normal state to the superconducting state at 5.6K and returned to a normal but magnetically ordered state between the temperature range of 0.3K and 0.53K. The main objective of this work is to show the temperature dependence of the upper critical magnetic field of superconducting HoMo<sub>6</sub>Se<sub>8</sub> by using the Ginzburg-Landau (GL) phenomenological equation. We found the direct relationship between the GL coherence length ( $\xi_{GL}$ ) and penetration depth ( $\lambda_{GL}$ ) with temperature. From the GL equations and the results obtained for the GL coherence length, the expression for upper critical magnetic field ( $H_{c2}$ ) is obtained for the superconducting HoMo<sub>6</sub>Se<sub>8</sub>. The result is plotted as a function of temperature. The graph shows the linear dependence of upper critical magnetic field ( $H_{c2}$ ) with temperature (T) and our finding is in agreement with experimental observations.

[tad4ju@gmail.com](mailto:tad4ju@gmail.com)

## O-nano-PV-organic (nano-)photovoltaics: Commercial and charge transport physics aspects

**Vaidotas Kazuškauskas**

Vilnius University, Lithuania

Current situation of organic (nano-)photovoltaics will be reviewed, starting from the underlying physics up to the current achievements and commercialization possibilities. The noticeable advances in the efficiency and price of the organic PV cells were achieved recently. These parameters are already suitable to start the commercial production. However, the first attempts failed several years ago. Nowadays several institutes and companies are competing in the field, exploring possibilities of different physical approaches and device engineering solutions. Microscopic charge transport properties are of primary importance in organic material and device engineering, as they determine macroscopic material parameters, thus conditioning device efficiency. Thus, understanding of the fundamental transport properties is an absolute must for the purposeful device engineering. We will demonstrate that in materials and structures that are promising for organic and hybrid photovoltaics carrier transport is influenced in a complex way by the light-, electric field- and thermally- stimulated mobility and trapping effects, depending on the excitation conditions. Carrier mobility measurements were performed by the CELIV (Charge Extraction by Linearly Increasing Voltage) method, carrier traps were analyzed by the Thermally Stimulated Current spectroscopy, and Current-Voltage characterization was used to investigate carrier injection and contact properties. Such complex experimental analysis by complementary methods enables discrimination and evaluation of numerical parameters of the mobility and trapping phenomena at different excitation conditions. Moreover, to correctly address transport and trapping issues, distribution of the density of transport states has to be taken into account.

[vaidotas.kazuškauskas@ff.vu.lt](mailto:vaidotas.kazuškauskas@ff.vu.lt)