Charge carrier mobility in organic solar cells materials

Diploma thesis abstract

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The given work is devoted to the measurement of the electron mobility in the films of soluble fullerene derivatives by space charge limited current method. Knowledge of electron mobility in fullerenes is essential for answering the question about the possibility of the use of given fullerene derivatives as a part of the active layer in organic solar cells, which usually include fullerenes or their derivatives in the active layer. To assess the adequacy of laboratory technology of preparing devices, the electron mobility in the films of well-studied substances - (1 - (3-methoxycarbonylpropyl)-1- phenyl-[6,6] methano[C60] fullerene (PCBM) was measured in a similar manner.

Mobility of charge carriers in the films bispheroid bicycloadduct BS, synthesized at the Chemistry Department of Moscow State University was measured to be $(1.2 \pm 0.9) \times 10^{-3}$ cm^2 / (V*s), therefore this fullerene derivative is suitable as a component of the active layer in organic solar cells based on conjugated polymers. The measured value of mobility in films of PCBM is $(1.4 \pm 0.5) \times 10^{-3}$ cm^2 / (V*s). It is in a good agreement with literature data, which confirms the adequacy of methods of preparing the devices and method of measurement.