INVESTIGATION OF HOLE TRANSPORT IN SMALLMOLECULE - POLYMER BLENDS

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Research on hole transport in organic layers is an important and complex scientific field that has emerged due to the rapid development of modern materials science and engineering. The main disadvantages of organic electronic devices are the low mobility of charge carriers in them and poor resistance to environmental influences.

In small-molecule organic compounds, higher charge carrier mobilities are achieved than in polymers. However, effective control over layer morphology remains a challenge [1]. On the other hand, polymer layers offer superior controllability in terms of structure. Consequently, combining small molecule materials with polymers holds great promise for the development of novel charge transport layers in organic electronic devices. In such compounds, polymers may simultaneously act as charge transporting components and supporting structural matrices. While the addition of polymers should enhance layer integrity, itś crucial to optimize the composition as it could potentially impact charge carriers transport.

For some of newly synthesized carbazole-based hole transporting materials [2], obtaining high-quality layers without cracks in sufficiently large areas is challenging, if not impossible, task. Therefore, these materials were blended in various ratios with well-known hole-transporting polymer PEPC (Poly(9-(2,3-epoxypropyl) carbazole)). Surface of casted layers was controlled by microscopy and AFM, while the charge transport in the layers was investigated by well-known methods such as ToF and photo-CELIV [3]. Obtained results show that a good layer structure without compromising hole transport can be achieved at the optimized composition. These results will facilitate investigation of novel hole transport materials.

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