



An experimentally-validated multi-scale materials, process and device modelling & design platform enabling non-expert access to open innovation in the Organic and Large Area Electronics Industry (MUSICODE)

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### Model validation by characterization of OLAE & PPV devices (2 of 2)

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## Publishable summary

This document reports the work carried out in Task 3.3 “Electrical characterization for model validation (M1-36)” under the WP3 “Model validation by analytical characterization (M1-M36)”. WP3 conducts experimental tests and characterization to validate the models of WP2. Task 3.3 focuses on the opto-electrical characterisation of the OE materials and devices.

This report shows the theoretical and experimental work undertaken in Task 3.3. Energy levels are determined in the solid state from cyclic voltammetry. Moreover, single-carrier devices have been fabricated and characterized by the partners involved to determine the charge carrier mobility of donor and acceptor materials. Different methods have been employed starting from analytical models to full device simulations, to overcome method-specific limitations. The determined mobilities for a set of commonly employed active materials for organic solar cells are presented. The results are compared to modelling work from WP2 and literature values.

The experience gained with the characterisation and analysis methods for material parameters (charge carrier mobility, energy levels, etc) are also employed in the user-cases in WP6. To facilitate a roadmap, develop repeatable processes, and standardize characterisation methods for this, all partners collaborated during monthly meetings in WP2, WP3 and WP6 to discuss device structures, problems, suggest analysis methods and propose mitigation strategies.