



Donnerstag, 12.11.2026, 15:30 Uhr

Ort: Reichenhainer Str. 90;
Zentrales Hörsaal- und Seminargebäude, Raum C10.013

Dr. Oleksandr Stroyuk

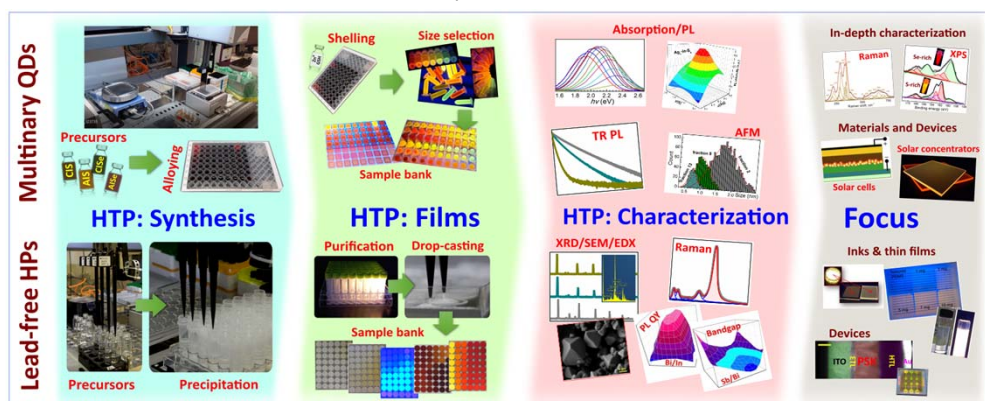
Forschungszentrum Jülich GmbH, Helmholtz Institute Erlangen-Nuremberg for Renewable Energies (HI ERN), Institute of Energy Materials and Devices - Photovoltaics (IMD-3), Erlangen

High-Throughput Robot-Assisted Screening of Solution-Processable Semiconductors for Energy and Optoelectronic Applications

Self-driving autonomous chemical labs guided by AI agents are expected to dramatically accelerate the discovery of new semiconductor materials for energy and optoelectronic applications. Successfully implementing such autonomous platforms requires experience with automated experimentation and robust databases of “parameter - property” relationships. We approach these tasks by combining lower-complexity semi-automated experimentation and human expertise in a high-throughput (HTP) materials screening platform, HTRobot, coupling multi-pipetting robotic operation with in-line HTP characterisations. The exemplary screening campaigns performed by HTRobot have targeted multinary metal-chalcogenide quantum dots [1] and lead-free double metal halide perovskites [2]. A typical workflow includes combinatorial synthesis of 2D ink arrays, post-synthesis manipulations (purification, size selection), HTP drop-casting of films, spectroscopic HTP characterisation, and production of samples for ex-situ structural characterisations, such as XRD and SEM/EDX (Figure 1). This approach enables rapid focus on semiconductors with specific spectral and photophysical properties for in-depth testing in functional materials. In the future, this methodology will be transferred to a fully automated materials acceleration platform, while the database collected in HTRobot-driven campaigns will be used to enable AI-driven autonomous materials discovery.

[1] O. Stroyuk, et al., Nano Futures, 2025, 9, 042505; The Chem. Rec., 2024, 24, e202300241.

[2] O. Stroyuk, et al., JACS, 2026, 148, 22364; Mater. Adv., 2025, 6, 4847; J. Mater. Chem. C, 2024, 12, 8705.



Alle Zuhörer sind ab 15:15 Uhr zum Kaffee vor dem Hörsaal eingeladen.