

Fabrication

InkJet Printing of QD Suspensions

Goal

- Feasibility study: Characterization and modification of perovskite quantum dot (QD) suspensions in terms of jet-ability for next generation QD-displays

Innovation

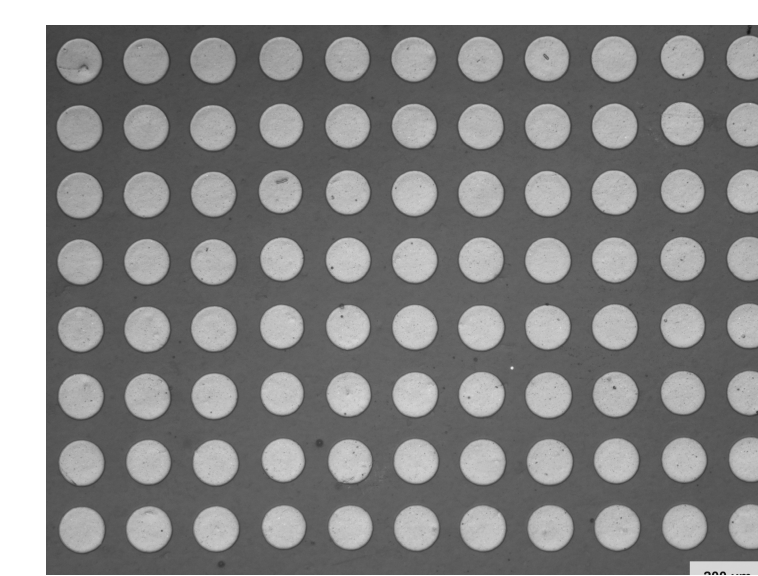
- Avantama's perovskite-QDs outperform state-of-the-art QDs (indium phosphides, cadmium selenide) in optical density, color gamut range, and energy efficiency

Challenges

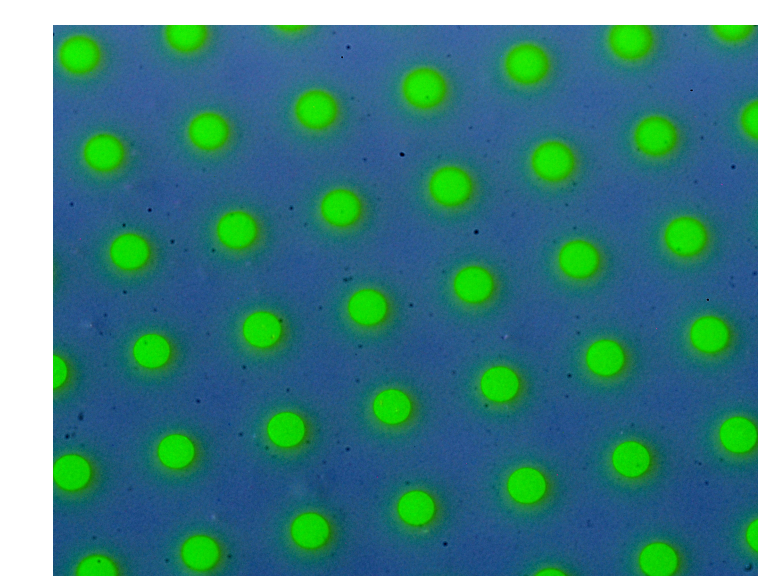
- Characterization and modification of QD-suspensions using inkjet specific characterization methods (TriPAV, TriMaster) and contact-angle measurements for surface tension
- Modification of QDs and matrix chemistry to enable jetting processes with high QD content
- Development of a jetting process (pulse modulation) and printing tests onto defined surfaces

Results

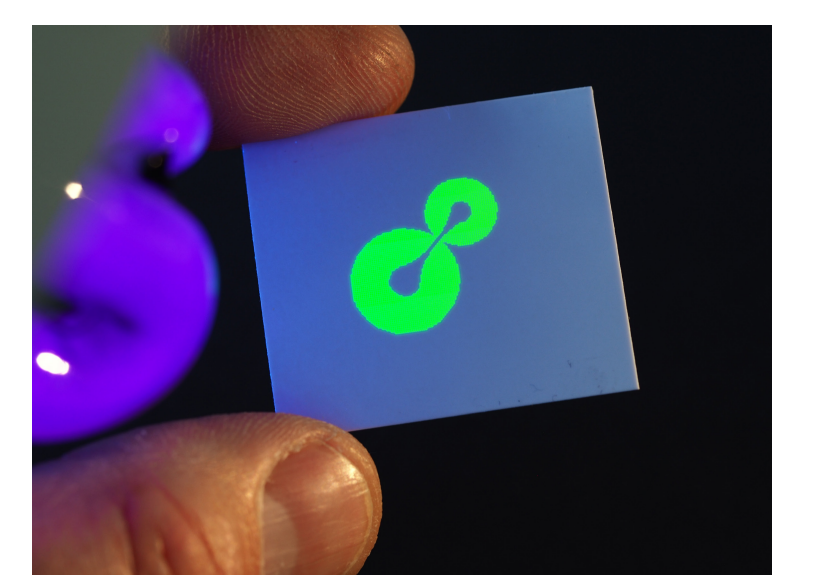
- Modified quantum dot suspension with QD content beyond 30wt.% have been reliably jetted
- Printed demonstrator exhibited at world's leading display show (SID Display Week '23)
- Printhead evaluated for industrial display fabrication



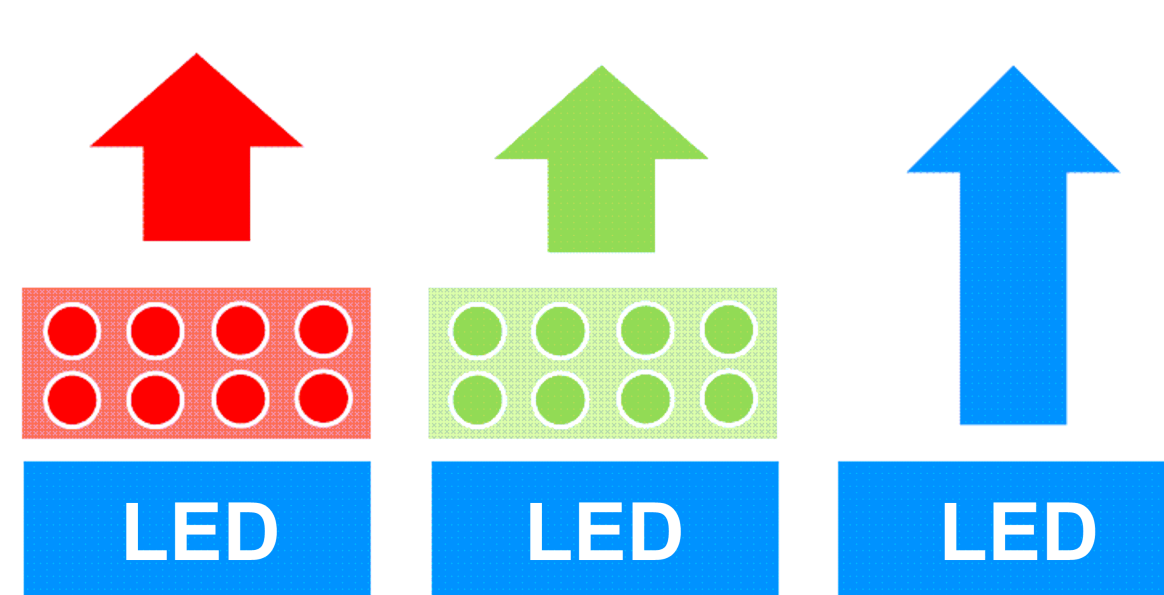
Light microscopy images of printed QD-dots on nanoporous photo paper.



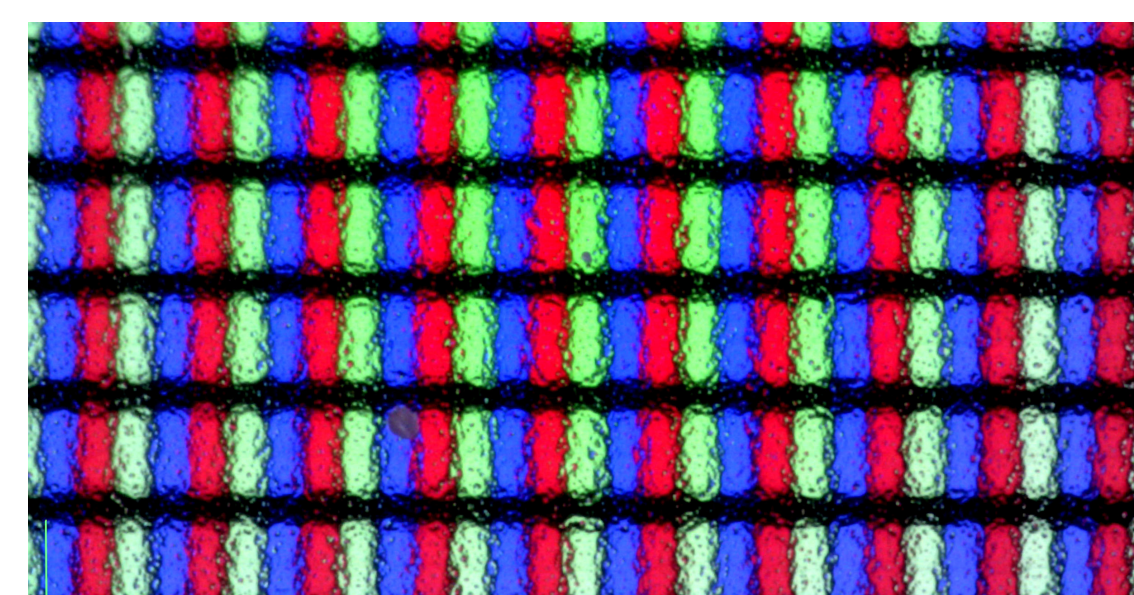
Camera image of printed QD-dots on nanoporous photo paper, illuminated by UV-light.



Printed QD-dots, illuminated by UV-light showing the company logo.



Pixelated QD color converters (PCC): QD color converter on top of LED sub-pixels.



Sub-pixels of a Dell 24-inch matte display.

Conclusion

Within the framework of this project, the jet-ability of various quantum dot suspensions could be shown. This feasibility study is the basis for a future collaboration on a disruptive display fabrication technology.

Funding

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