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Microtransfer Printing Of Al₂O₃-passivated SWIR-PbS QDs Photoconductors

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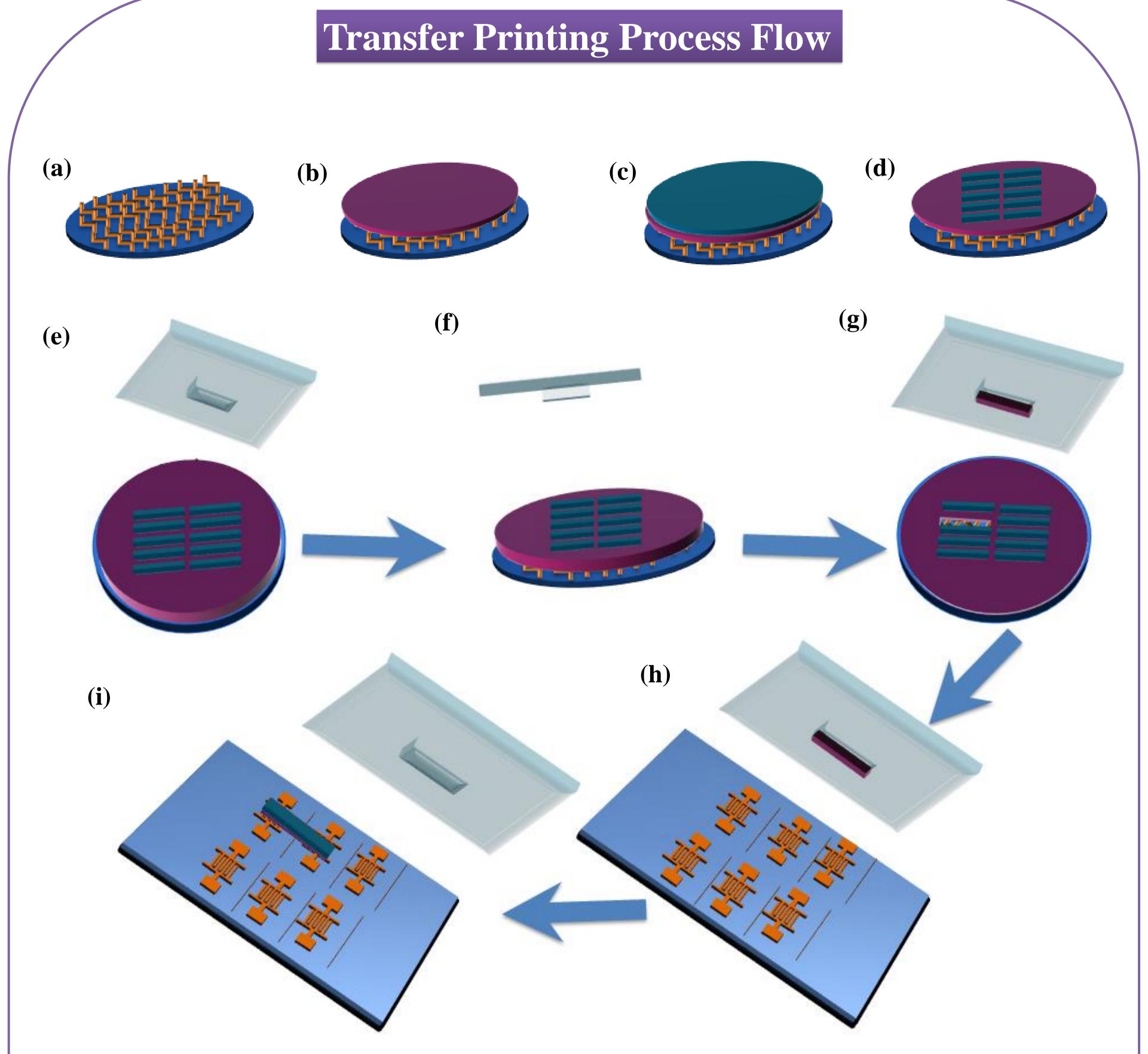
O/M/D Phonsi Nanophotonics by nanocrystals

Target:

Towards wafer-scale integration of air stable QDs on commercial silicon read-out integrated circuits.

Challenges:

Facile, localized QD film patterningLong life-time photostability



Transfer Printing Approach:

Selective pick-and-print of Al_2O_3 passivated QD assemblies on device structures with high precision.

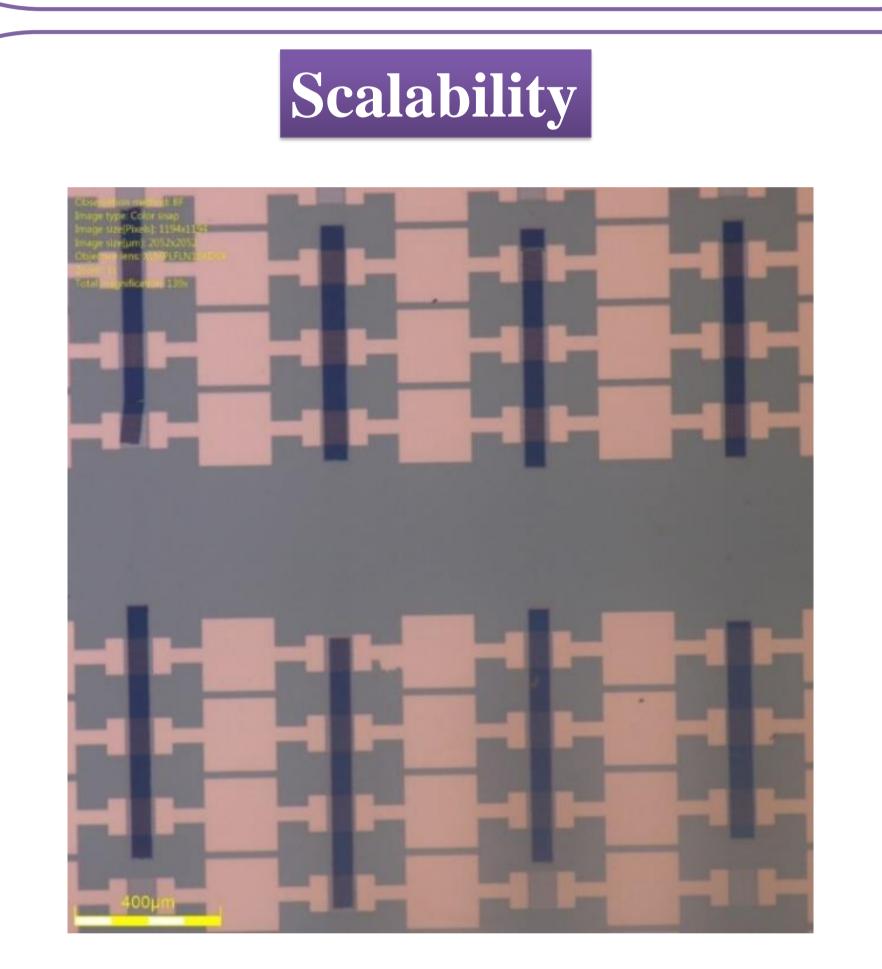


Fig.1 (a-d) Source substrate preparation, including ODTS-Si preparation, QDs

spin coating and ALD-Al₂O₃ encapsulation. (e-i) **Pick-and-Print** of Al₂O₃/PbS

patches on interdigitated electrodes on an oxidized Si wafer

Fig.2 Integrated Arrays of printed Al₂O₃@PbS_{2.1µm} QD photoconductors

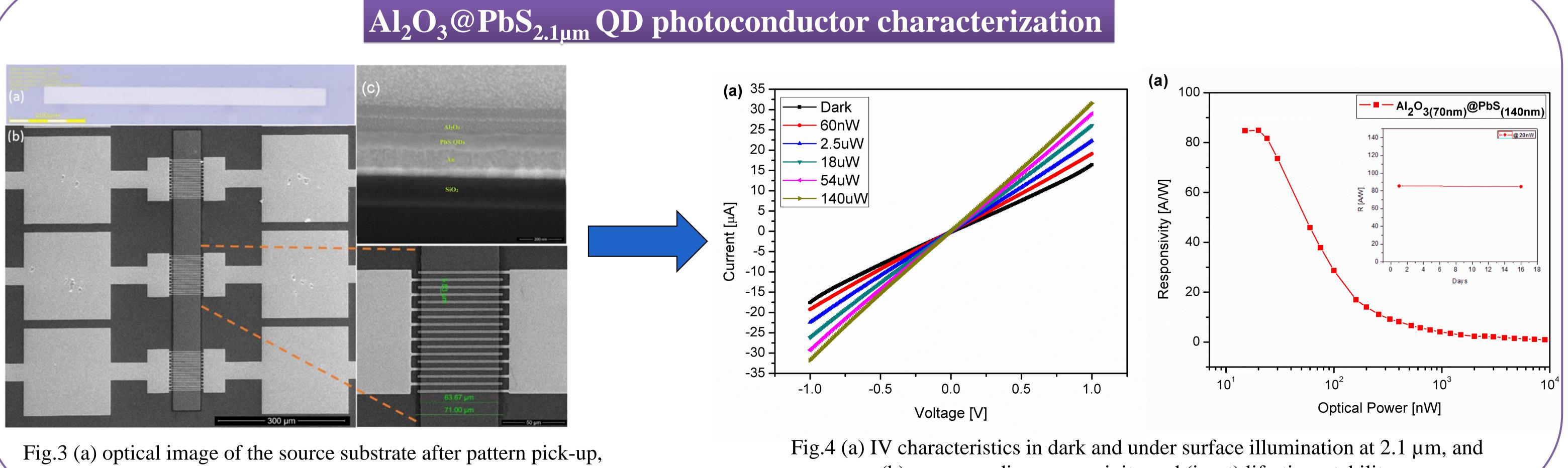


Fig.3 (a) optical image of the source substrate after pattern pick-up, (b) Printed Al2O3/PbS QD photoconductor, and (c) cross section.

(b) corresponding responsivity and (inset) life-time stability

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