Inert Piezoelectric Inkjet Print Head Technology for Advanced Fabrication of Solar Cells

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Abstract

Piezoelectric inkjet technology is being used, tested and evaluated to replace traditional manufacturing processes in three main industries - flat panel display, printed electronics, and solar cells due to (1) efficient material usage (cost saving and environmentally friendly), (2) direct write process (an additive process), (3) speedy set-up (digital printing and no masks needed), (4) large area printing, (5) high productivity by increasing number nozzles and jetting frequency, (6) non contact printing for sensitive substrate, (7) print heads and jetting materials tailored for specific applications and (8) ultimately low capital investment . Especially, the emerging market opportunities are in production of an efficient planar rear emitter back contact silicon hetero-junction solar cell different from conventional silicon wafer solar cells. It will require inert print heads to jet a wide range of fluids for fluidic dispensing and manufacturing processes. This paper focuses on jetting material compatibility with print head used for etch and dope processes in the solar cell fabrication.