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Thin-film Silicon Solar Cells Using an Adhesive Bonding Technique

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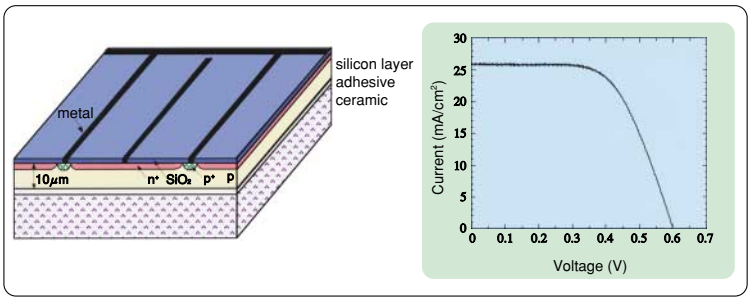
Thin-film silicon solar cells using an adhesive bonding technique have been investigated. A 10-µm-thick single-crystalline solar cell was fabricated by adhesive bonding of an alumina ceramic substrate, and the cell performance was estimated. The open circuit voltage, short circuit current and cell efficiency were 602 mV, 25.8 mA/cm^2 and 9.6%, respectively. Although the silicon layer of the cell is very thin, high open circuit voltage is obtained. The results indicate that the adhesive bonding technique is suitable for realizing high-efficiency thin-film cells.



Schematic representation and current-voltage characteristic of the 10-µm-thick solar cell

Nanotechnology and Materials Science & Technology

Development of Ultrafine Ink-Jet Technology

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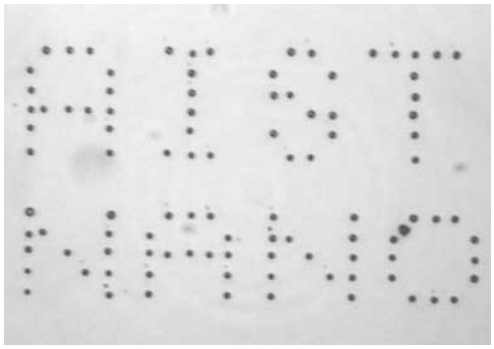
The ultrafine ink-jet technology developed makes it possible to dispense ultra fine dots with a size smaller than 1/1000 the volume size of dots produced by currently available technology. Printing of a few microns wide ultra fine wiring patterns of silver directly onto the substrate has been successfully carried out by using NanoPaste™ (Harima Chemical Co.), stable dispersion of superfine metal particles. This technology can be applied not only to surface mounting related technologies but also to innovative applications in other nanotechnology fields such as biotechnology, optical and ultrafine processing technologies.



A example of fine characters using sub-micrometer diameter dots (dot pitch 3-micrometer)