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Large-area anodic oxides for photovoltaic applications

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Anodic oxides have been shown to electronically passivate silicon wafer surfaces very effectively and, if able to replace existing thermal or plasma processes, may enable significant cost savings for the manufacture of a range of electronic devices and be of particular value to large-area devices such as solar cells. Low-cost surface passivation is key to reducing the cost per watt of power produced by silicon photovoltaic devices. In this presentation new methods for forming anodic oxides that can result in the formation of uniform oxides on the 156 mm silicon wafers that are currently used for commercially-produced solar cells will be described. These methods use a light-induced or field-induced current which passes through the p-n junction of a silicon solar cell and therefore perpendicular to the surface being anodized. This current flow enables a uniform potential to form across the entire wafer surface and consequently results in more uniform anodization. In this talk, the author will present physical and electronic characterization data for anodic silicon oxide layers and porous anodic aluminium oxide layers, the latter of which are formed by anodizing a layer of aluminium formed on a silicon wafer surface. The use of anodic oxides in prototype silicon solar cells and explore applications for large area anodic oxides beyond photovoltaics will be demonstrated.

Biography

Alison Lennon has completed her PhD in Biophysical Chemistry at The University of Sydney, New South Wales, Australia in 1996. She then worked as a Research Scientist at Canon for 10 years before returning to study for a second PhD in Photovoltaic Engineering at the University of New South Wales. Since graduating in 2010 she has worked as a Senior Lecturer at the University of New South Wales where she teaches undergraduate and postgraduate students semiconductor device theory associated with silicon solar cells and photovoltaic technology and manufacturing. She has published more than 35 papers in reputed journals.

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