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Silicon nanocrystals surface engineering by low-pressure plasmas and atmospheric-pressure microplasmas DAVIDE MARIOTTI, NAMRI - University of Ulster (UK), VLADIMIR SVRCEK, Research Center for Photovoltaics-AIST (Japan), ASHISH MATHUR, NAMRI - University of Ulster (UK), MICHIO KONDO, Research Center for Photovoltaics-AIST (Japan) — Quantum confined silicon nanocrystals (SiNCs) may offer great opportunities in a wide range of applications due to several favorable characteristics. Firstly, silicon has limited environmental concerns, is considered a safe element and can rely on a well-established industrial know-how. Furthermore, silicon at the nanoscale is revealing interesting and useful properties. The potential applications include photovoltaics, optoelectronics and health care technology. However the control and synthesis of desired SiNCs surface characteristics are crucial for successful device integration and are currently fueling the debate on achieving accurate measurements of SiNCs properties. We have therefore investigated the possibility of using carbon as the main element to provide desired surface functionalization and/or passivation. In the first case we have used SiNCs to catalyze the growth of carbon nanotubes in microwave low-pressure methane plasma. A second different approach has been to use atmospheric-pressure microplasma to provide C-terminations to SiNCs in ethanol dispersion.

Davide Mariotti

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